

COLLEGE OF ENGINEERING

CORNELL UNIVERSITY

The Cornell

engineer



MAY, 1952

VOL. 17, NO. 8

25 CENTS

Another page for

YOUR BEARING NOTEBOOK

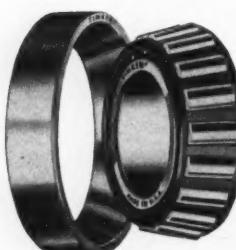
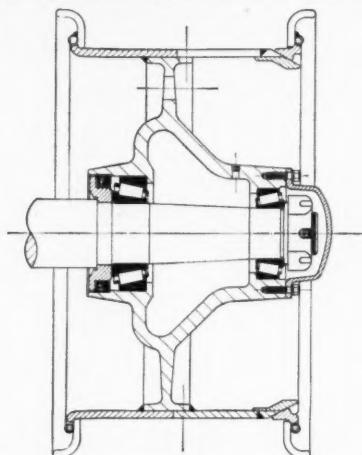


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Bearing applications on large-capacity scraper wheels pose two problems to design engineers. One is the heavy loads. The other is wear. Engineers solve both problems at once by mounting scraper wheels on Timken® tapered roller bearings. Line contact between rollers and races of Timken bearings provides extra load-carrying capacity. The true rolling motion and incredibly smooth surface finish of Timken bearings practically eliminate friction and wear within the bearing.

Mounting scraper wheels on TIMKEN® bearings

This is a standard wheel application showing indirect mounting of Timken bearings. The bearings are adjusted by means of a nut. Cups are mounted in the counterbored hubs. The use of Timken bearings in this application keeps the shaft concentric with the housing, thus the seals are more effective in keeping dirt out, lubricant in.



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Some of the engineering problems you'll face after graduation will involve bearing applications. If you'd like to learn more about this phase of engineering, we'll be glad to help. For a copy of the 270-page General Information Manual on Timken bearings, write today to The Timken Roller Bearing Company, Canton 6, Ohio. And don't forget to clip this page for future reference.

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ORDER NO.

SUBJECT *Reflex Klystron Oscillator* NAME *R. Brown*

DATE *1/23/51*

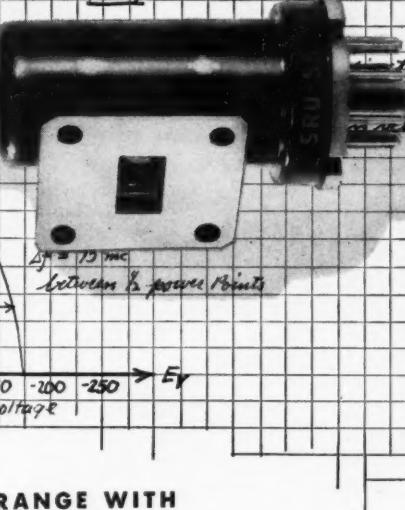
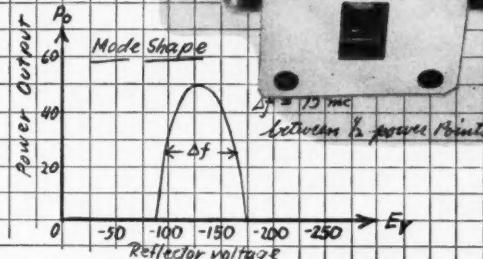
Requirement:-

A wide-band klystron in Ku band which operates at low voltage (less than 350 v.)

Choice #1:- *Type SRU-55 reflex klystron*

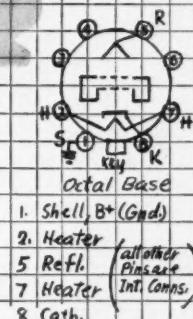
Data:- *Covers range from 14,000 mc to 17,500 mc. (3500 mc, 22% band)*
15-60 mwr. output. Max. beam voltage = 350 v.

Tuned by means of
Waveguide
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maximum 70 °C.



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LOW-VOLTAGE KLYSTRON 14,000 to 17,500 MC at 300 VOLTS

Type SRU-55 is a low-voltage, reflex klystron oscillator with radio frequency output of 15 to 60 milliwatts, operating over the frequency range of 14,000 to 17,500 mc. This Sperry tube can be used as a local oscillator for microwave receivers or as a bench oscillator in the measurements laboratory.

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The klystron tube described here is but one of the many Sperry Klystrons which has resulted from Sperry's sponsorship of the development of the klystron in 1939. From Sperry laboratories have also come a complete line

of Microline* instruments for precision measurement in the entire microwave field. In these labs career-seeking engineers keep learning but start earning — work with acknowledged leaders in their fields — do interesting, creative, important work — find the opportunity for advancement as high and broad as their own capacity for improvement.

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Takes a lot to lay a carpet in the jungle

The scene is "darkest Africa".

But Africa is lightening. Man's quest for minerals, for new areas for agriculture and trade, is slashing ultra-modern, glaring-white air strips in once impenetrable jungle.

Those pavers, portable air compressors, pumps and air tools—such as you might see working a city street—are Worthington Blue Brutes going to "lay a carpet" in that hole in the jungle.

Thus, Worthington, a major producer of equipment for public works, industry

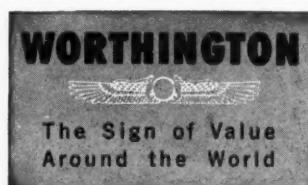
and farm, brings the fruits of American technical genius to the strange places of the world.

And illustrates, too, how the unique American talent of *diversification* helps public, employees and stockholders. For Worthington makes many things—not just construction equipment and pumps, but also engines, water works machinery, power transmission, petroleum equipment, air conditioning and refrigeration, many others.

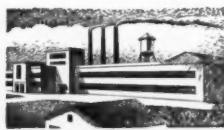
Such diversification builds *stability* . . .

makes Worthington, 112 years old, a strong link in the chain of American business.

Worthington Corporation, formerly Worthington Pump and Machinery Corporation, Harrison, New Jersey.



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Petroleum Products—compressors, engines, pumps, chilling equipment, refrigeration, decocking systems



More Abundant Food—compressors, fertilizer mixers, air conditioning, refrigeration, pumps

"We talked JOBS over the coffee"

Listen to an alumnus talking — and consider his remarks:

"The other night, I went to my college class dinner—the annual get-together of Tech Class of '41. After dinner, we sat around over the coffee—talking about all the things the last eleven years brought us. You know—a typical bull session.

"Pete Berry was sitting next to me. He was voted 'most likely to succeed' back in '41. But he's been going from job to job ever since the war. Looking back now, it's easy to see why.

"Like others in our class, he went into defense work that June. Did a good job, too—and so did his company. But unfortunately his company was a 'war baby' and a couple of months after the Japanese surrender—poof, no company and no job. He's been moving around ever since.

"But I played it safe. I picked Goodyear Aircraft Corporation to work for—and I've been there ever since. They're a subsidiary of the world's largest rubber manufacturing company, so I knew that GAC

would still be around—still be doing business come defense, war or peace. I knew they were even then doing plenty besides turning out aircraft and parts—because GAC is an engineering organization and a production unit.

"You know, as we sat there over our coffee, Pete said something that made a lot of sense. He told me 'If I were picking my first job today, I'd play it the way you did—pick a company that's going to be in business for keeps.'

"That's pretty good advice for anyone looking for an engineering spot today—pick a company like Goodyear Aircraft, and hold for the long pull."

*Think, man! That could be you
talking ten years from now.*

Whatever engineering field you're trained for, you'll find current projects under way to interest you at Goodyear Aircraft.

And you'll find activities ranging far from the aeronautical operations implied by the name of the company. More important—you can be sure that GAC will carry on—come what may—as a subsidiary of Goodyear, The Greatest Name in Rubber.

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Submit brief resumé of your qualifications and experience for prompt consideration to: Salary Personnel Department, Goodyear Aircraft Corporation, Akron 15, Ohio.

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How Fires Start . . .

Carelessness

Top-of-the-list cause of fires, according to study after study, turns out to be just plain human carelessness.

Under the heading "Careless smoking habits" you'll find such oddities as the

waitress who cleaned *hot* ash trays with napkins destined for the laundry chute, and the mechanic who tossed a match into a puddle of gasoline. But far, far more frequently it's simply the ordinary guy who unthinkingly tosses away a lighted match.

How Fires Are Stopped . . .



Grinnell Sprinklers

Education does a world of good to prevent fires from *starting*. But until human behavior is perfect, your best protection lies in *automatic control* of fire.

The surest control is with Grinnell Automatic Sprinkler Systems, which

check fire at its source, wherever and whenever it may strike, with automatic certainty. For more than seventy years fires starting in buildings protected by Grinnell Sprinklers have been extinguished before doing material damage.

Grinnell sprinklers are your assurance of positive, *automatic fire protection*.

GRINNELL FIRE PROTECTION SYSTEMS

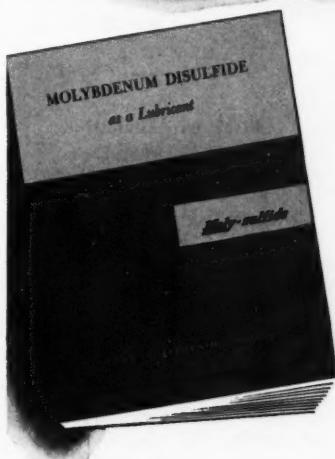
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LETTERS TO THE EDITOR

**Readership of this Journal Alive to Issues of the Day. Point out
Salient Features of Many Grave Topics of Concern to All of Us.**

SIR:

We want to congratulate the engineering colleges of Cornell for supplying so many fine young engineers to our organization. We are eagerly looking forward to greeting a large new group this summer. Keep up the good work.

Major W. E. Wantchu
Food Service
Sampson AFB, N. Y.

Regrettable Error In Spelling Shown

SIR:

I realize that you have a spotless record for proofreading and clean copy. However, in reading your Alumni News for April, I was shocked to find my cousin's name misspelled. Please note this correction in your May issue or consider my subscription cancelled.

Tony Mankiewitzkevich,
Chem.E. '34

Correction: Mankiewitzkevitch, not Mankiewitzkecich. Our deepest apologies. Last year's bargain subscription rate continues for 1952.
—ED.

Serious Ideological Question: Reader Doubts Existence of Electrons

The following letter was received from a little girl. We believe it is quite important and has far-reaching implications.

Dear Mr. Editor,

Is there really such a thing as an electron? For weeks now, my friends have been telling me that there aren't—that it's only make-believe for children—that Grimm's

Fables of Physics was written by some foolish old man who just wanted to make children happy.

Is this all true? I'm losing my faith.

A little friend,
Virginia, EP '66

Dear Virginia,

Your friends are wrong. Yes, Virginia, there are electrons. Just because you can't see something doesn't mean it isn't there. Just because you can't see the leprechauns doesn't mean they're not dancing on your lawn on St. Patrick's Day.

Some people will try to tell you that there are not electrons. No electrons? Why that's just like saying Paul Bunyon never roamed the forests of Minnesota.

These people are disillusioned cynics, men whose hearts have become poisoned in the materialism of today. Don't listen to them, Virginia. Just remember, as long as there is love in your daddy's heart, there will be electrons.

The Editors.

Cornell Engineer Damaging to Morals

SIR:

Unless you discontinue your risque jokes (STRESS AND STRAIN) permanently, we will be forced to discontinue our subscription—permanently.

We find our students wasting valuable study time reading copies of the CORNELL ENGINEER stolen from the school library. Many have dropped comparatively wholesome comic books in favor of the ENGINEER joke page.

You will agree that something must be done. Your cooperation will be a blessing to thousands of

high school students throughout the nation.

Miss Hattie Schwantz
Librarian, P.H.S. No. 5
Pascagoula, Miss.

My God, they think our jokes are funny! —ED.

Refer to Financial Statement in this Issue

SIR:

It is my understanding that all campus publications, with the notable exception of the *Cornell Daily Sun*, are supposedly operated as non-profit organizations. Last week I stumbled by accident on the expensively furnished Lincoln Hall Offices of the CORNELL ENGINEER. On the bulletin board was a chart showing a net profit for the year 1951-1952 of \$3.78.

I feel that an explanation to the engineering campus and alumni is in order.

E. Kefauver
Cornell Crime Committee

Lack of Musical Talent Pointed Out

SIR:

After reading your article by I. B. Margiloff ("The Musical Valved Brass," March, 1952), I couldn't help wondering why Mr. Margiloff isn't currently working for Ray Anthony.

A music lover

Mr. Margiloff gave up music at the age of thirteen after trying unsuccessfully for four years to whistle *The Star Spangled Banner*. —ED.

THE CORNELL ENGINEER

You are giving away your standard of living

FANATICS in Germany, India, even some in America, say we should scatter our billions over the world in order to use up our surplus; otherwise (they say) it will dam up on us and cause a depression.

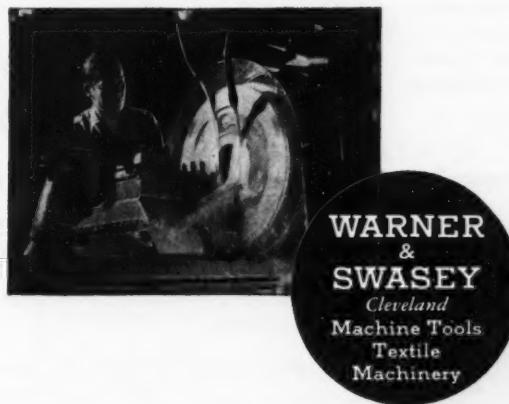
It is entirely possible that we should give away those billions for humanitarian reasons—that is another matter. But don't let's let greedy foreigners and stupid Americans say we're doing it for our own selfish interests. And don't let anyone of us think we are doing it by "soaking the rich". We are giving away (and, remember, perhaps we should, so long as we do it with eyes open) our standard of living.

You and I work, not for dollars but for what those dollars will buy. The more *things* there are in America, the more your day's work and mine will buy. The more steel there is in America, the more automobiles you can get at a low price. The more cloth, the more suits you can own. The more food there is, the better you and your family will eat.

There can only be so much of those things. When you ship them away; you do without. You seldom ship *money* abroad; money is only a token of exchange for the *things* that are going out of this country, out of your reach.

Perhaps that's good, perhaps that's wise. But we should realize what we're doing. Whatever we give away abroad comes out of what we have at home. Unless, of course, each of us produces that much more at his machine or plow or desk *every day*.

If every one of us *produces* more efficiently we can have the satisfaction of knowing we are doing something for the world without destroying America . . . the one strong hope of the world. If we "share the wealth" with the world, we will soon be sharing nothing but poverty. If we share our *increased production* and demand increased production in return, there will then be wealth *and* strength to share.



YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS AND TAPPING MACHINES

No Faster Finish

PROBLEM . . .

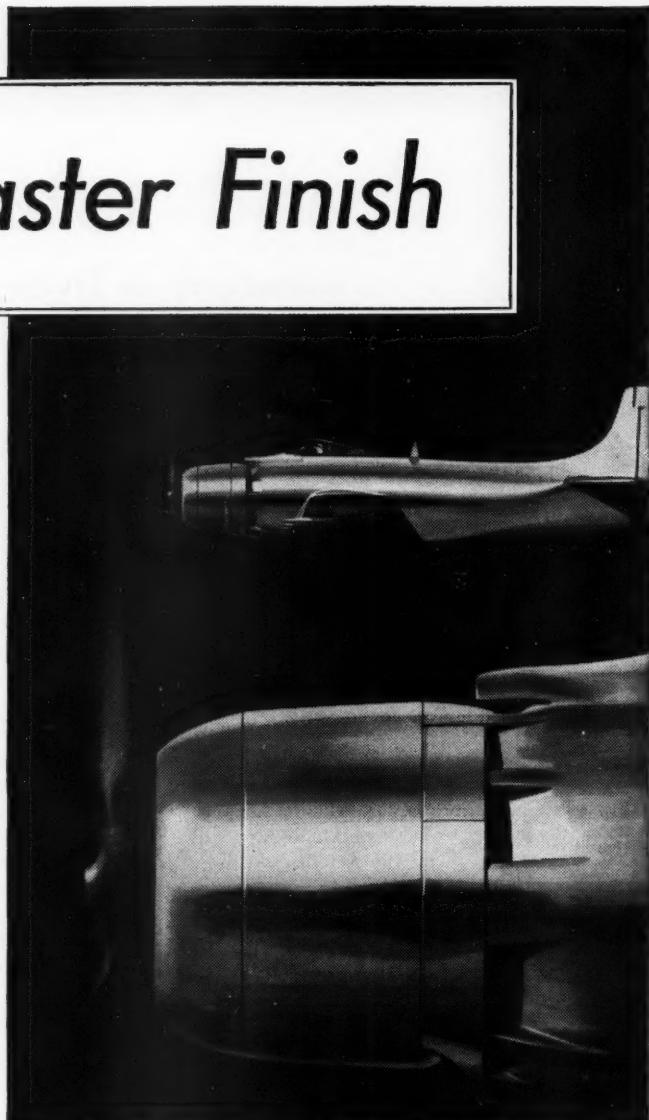
. . . finishes for aircraft and other military needs which can be applied fast, dry fast without baking, and stand up under severe service conditions.

SOLUTION . . .

. . . hot-spray lacquers now made by many companies from Hercules® nitrocellulose. These new lacquers, thinned by heat rather than solvents, permit more actual lacquer to pass through the spray gun. Now, one hot coat frequently does the job where two coats had been used.

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Hercules' business is solving problems by chemistry for industry . . .



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THE CORNELL

engineer

MAY, 1952

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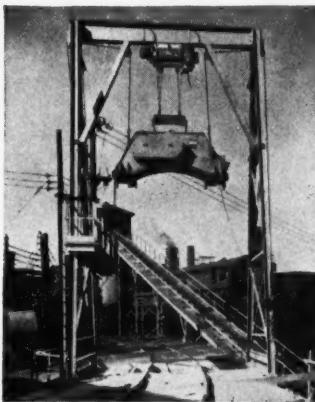
"Find Yourself" ... without losing time!

by FLOYD O. SMELTZ, Supervisor, Standardization Section
WEST ALLIS WORKS (Graduate Training Course 1950) Ohio State—EE—1949

SELECTING a specific job in the engineering field after graduation from college is a tough proposition for most of us. It was for me, and that's why I came to Allis-Chalmers. I thought I wanted to be a development engineer but I wasn't sure. Allis-Chalmers Graduate Training Course gave me an opportunity of trying design and development—and other types of work also. By my own choosing I am now engaged in challenging work which I hadn't even



FLOYD O. SMELTZ



Allis-Chalmers car shaker empties coal and ore cars in minutes. Saves time . . . prevents injuries by keeping men out of car interiors.

considered while in school. The point is, all GTC's have the same chance of "finding themselves."

That's the outstanding feature of Allis-Chalmers Graduate Training Course. You have a very broad selection, and you yourself choose the type of training you receive. Of course you get help and guidance from experienced men throughout your training period. You need it, since there are jobs here that you have never dreamed of.

Finds Job Challenging

Take my job for instance. To the engineering student it probably sounds rather dull when compared with Advanced Thermodynamics or Electric Transients in Power Systems. But, in my opinion, the

most fascinating science is co-ordinating engineering and production efforts through standardization of procedures, parts and materials. As Supervisor of the Standardization Section and Chairman of the Standards Committee, I encounter new problems everyday—no monotony here.

But that is only part of the story! I am also Secretary of the Chief Engineers' Committee and Secretary of the Development and New Products Committee. What could be more stimulating for a young engineer than to be at the crossroads, where he can watch the engineering planning of an expanding company?

No Limit to Opportunities

I never thought I'd be doing this when I graduated from Ohio State in 1949 and enrolled in Allis-Chalmers Graduate

Training Course. As I mentioned, I was particularly interested in design work at that time. In fact, right now there is a patent applied for on an electro-magnetic relay device I designed. Yes, they even let me do development work while still a GTC student.

A student helps plan his own courses and is free to change his plans as new interests, new opportunities present themselves. He can divide his time between shops and offices—switch to design, manufacturing, research, application engineering, sales, or advertising—and can earn advanced degrees in engineering at the same time.

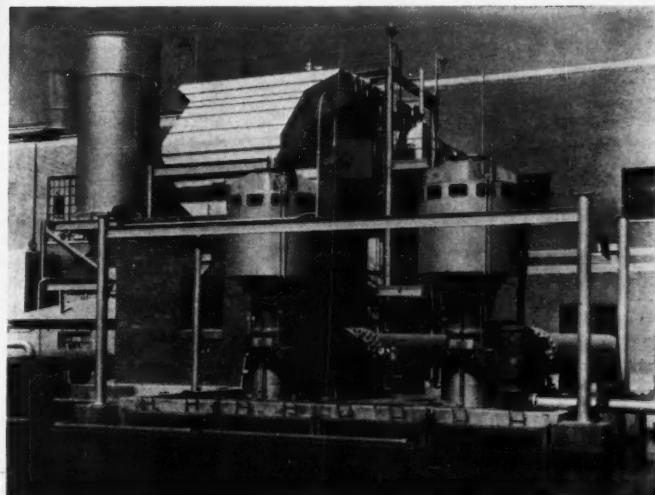
When he graduates from the course he is encouraged to go into the type of work he liked best while on the Graduate Training Course.

One of the reasons Allis-Chalmers offers so many opportunities is that A-C designs and builds machines for every basic industry, such as: steam and hydraulic turbine generators, transformers, pumps, motors, rotary kilns, crushers, grinders, coolers, screens, and other machinery for mining, ore processing, cement, and rock processing. Then there are flour milling, electronic equipment and many others.

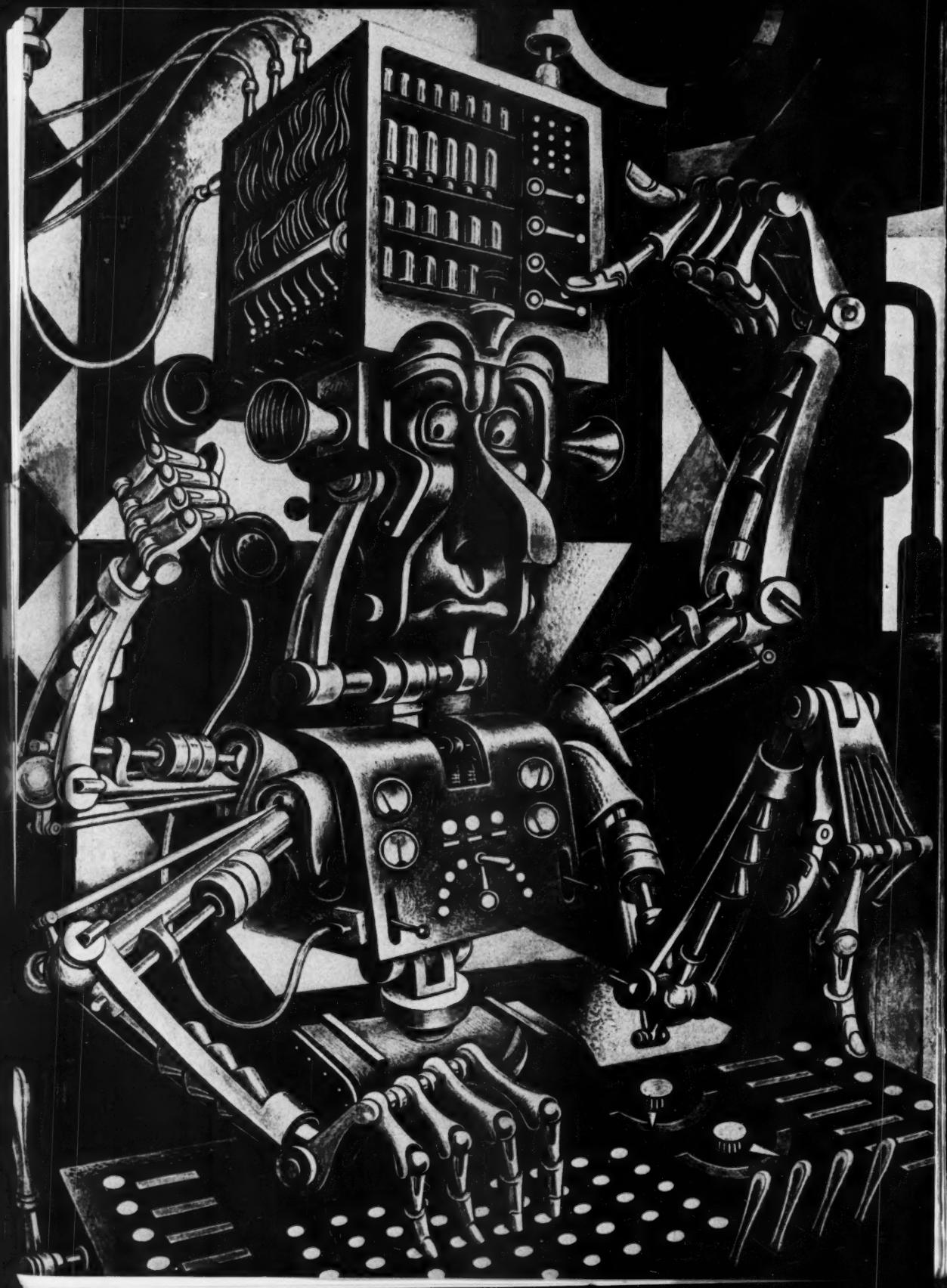
There is no other organization that seems to me to offer the graduate engineer such a wide range of activities, or that gives him such a chance to find the type of work for which he is best fitted.

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee 1, Wisconsin



Weatherproof motors for condenser cooling water circulating pumps were mounted outside doors to conserve valuable building space for a Texas utility.



Lab Reports - Theory and Practice

By EDELWEISS GREENLOUSE, ME '52

It may occasionally happen that someone will try to find out what it is that makes a good lab report. He will consult volumes large and small on the technique of report-writing, corner professors, berate assistants, and harangue his fellow students. They all have their theories, and the faculty members may even advance some recommendations. But no one ever finds out what a good lab report is, for all opinions differ. The best that can be done is to find out what a *successful* lab report is, which is defined as a report with a high mark. And this is indeed a horse of another color.

A Successful Report

A successful lab report embodies a flattering approach to the professor, in which you show that you have gone to his lectures, or read his book, or done the calculations the way he likes them done, or disagree with his enemies. If you can combine all these with a lofty indifference to the requirements of good prose and a curt dismissal of the requirements of interesting reading, ignore the correct data points on the graphs, and in general behave as if you were in psychic union with the person who is to mark the report, you may win your prize.

With the current price of waste paper at a few cents a hundred-weight, it doesn't pay to combine quality with success in your report, as that might make it too bulky and might convert too much good blank paper into cheap waste. In

addition, it is wise to remember that your professor may be able to recognize quality when he sees it (though this is rare) and you will pay heavily for your indiscretion.

There are several kinds of lab reports, of course. A popular kind is that which constitutes about the only work in the course and which exists merely to provide some justification for inclusion of the course in the catalog. These are likely to be short on literary quality but long on labeling of graphs. In fact, labeling of graphs is so highly developed in some courses that such labeling takes more time than both the experiment and the rest of the report together. There are reports, also, that are completed just by filling in blanks, as in freshman

physics. (Freshman physics reports are intended to give the freshman an introduction to college life, anyway, and are not supposed to teach much physics.)

Best Type of Report

The best type—and the type most in keeping with the marking system here (that assigns marks to two places and averages them to four)—is the report designed to lower the student's average. In the ChemE school for example, marks for Material and for Form are multiplied together to give a resulting report mark which is always lower than either of the component marks. Ostensibly this system is based on the medieval educational concept that reports should be in-

ABOUT THE AUTHOR

Edelweiss first saw daylight in East Memphis, Tennessee, twenty-one years ago. After moving to St. Louis, to Chicago, to Peoria, to Reno, back to East Memphis, and to Atlanta, Georgia, his family settled in San Quentin for a twenty year stretch. Edelweiss attended Mount Parraflop Prep School in Reno, Nevada, for six years before he entered the Sibling School of Mechanical Engineering in 1945.

Edel is a member of Phi Iota Gamma, social and gustatory fraternity. He was president of the latter organization until last spring when he came down with yellow jaundice. Other campus activities have been ROTC stables, Sibley Basement lacrosse, low altitude bombing, Risley Hall, the SPCA, Willard Straight men's room, publicity representative for the Inter-Varsity Christian Fellowship, butt-scrounging and sniping, and he is a member of the Sewer Cleaners

Honorary Society. Ed was a Freshman Camp counselor until the Reverend Ritchie caught him selling French postcards.

Greenlouse' roommate, John Mossback, Arts '57, is a physics major, but Ed says he doesn't mind. Ed has spent six months trying to teach his roommate how to count the number of scales on a beginner's slide rule. John is now up to two. They make a wonderful team, as only last week Ed learnt how to use his toes as an aid to addition and subtraction.

The reason Ed has so many extra-curricular activities is that he has made "never let your school-work interfere with your education" his motto. Even though this has caused his marks to drop below passing, he thinks that his time here has been well spent. Ed's parting remark was "I would rather be a big wheel than pass a prelim."

Artist's conception of the Freshman Engineer of Tomorrow. Note lack of human features. Probably class of about '60.
—Artzybasheff

structive and clear. Reasoning that if either the material or the form is worth nothing the report is no good and deserves a zero, it is clear that a report with marks of 70 for material and 80 for form deserve a mark of 56. Mathematically, the mark is

$$\text{Mark} = (\text{MF})/100$$

where M = mark on material included

F = mark on form or presentation.

It might be irreverently pointed out that, starting from the same boundary condition, we can derive any number of equations, as:

$$\text{Mark} = (\text{MF})^2/100$$

$$\text{Mark} = (\text{MF})^3/100$$

$$\text{Mark} = (\text{MF})/100$$

etc.

Every one of these will show a mark of zero when either material or form is given a zero. And each of the above equations has as rigorous a derivation as the one actually used in Unit Operations. What more could one expect, when the derivation is based on nothing more than boundary conditions? This marking system is not entirely peculiar to Cornell, for one of our Ph.D. alumni has carried it to Union College in Schenectady for a course in colloid chemistry.

On a broad scale, however, marks generally run from 60 to 100, in a sort of gentleman's agreement that the rest of the scale is not to be resorted to unless in cases of extreme emergency. Marks vary between these limits of 60 and 100 in accordance with the age, sex, inattention, and dyspepsia of the report marker. His hostility, too.

There may also be lab reports set up to gain information. But since the

equipment given out is usually made of rusty nails, empty beer cans, and damp thumbs, the data aren't very good. Besides, all the information is already tabulated in even the most elementary texts, derived, to be sure, with the same equipment.

Outline of Writing Procedure

So much for general theory. We now pass to a brief outline of the actual writing procedure, followed by a short example of the procedure carried out. To be as general as possible, we have chosen a report from the ME school's famous Mech Lab as an example. The topic is Lubricating Oils.

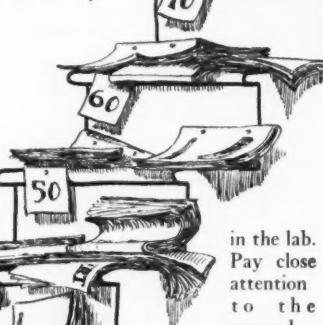
To be considered when writing a report or doing an experiment are *Purpose*

—To show that the man at the garage will cheat you every time, or the man at the garage is ignorant, or the ASTM is wrong, or you shouldn't smoke in the oil lab.

Object — to complete the report.

Method —

Several hours will be spent



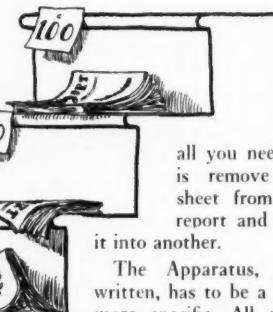
in the lab. Pay close attention to the proceedings. You may be

called upon at any time to wake up and do your share of the work. Do not sleep on the floor, at any rate, because the previous section spilled oil, and your instructor has not yet cleaned it up. Also, do not pour oil through the holes in the floor because the machinist below on the first floor is very sensitive.

Procedure — Find your instructor and receive your instructions. Lock

the instructor out of the room. He will be of no further use to you and may get in your way. Perform the experiment as well as you can, trying to remember what your instructions were. Push your instructor's ladder away from the window. Rinse the data sheet with benzene occasionally to remove the oil spilled on it during the horseplay. Go home, leaving the door open so that the instructor can come in to clean up after you. Organize your report in the following manner:

The *Object* should be so written that it will cover almost any topic available in the course. In this way it will be useful for other reports;



all you need do is remove the sheet from one report and bind it into another.

The *Apparatus*, next written, has to be a little more specific. All right, then. There were some test tubes, burners, retorts, tongs and fire extinguishers. Arrange them in three neat sentences placed pleasantly on the page and you're done.

Do the same for the *Procedure*, if you have time. If you don't, use the procedure from the report on Torsion Testing.

Insert the *Data Sheet*. Include a page of sample calculations, and all the tables your instructor has provided. The calculations may also be from the Torsion report.

The *Discussion* follows, and includes the graphs. There should be at least two graphs in every report, even if they are the same, and there should be more if you can think of them. Sometimes it is nice to plot the data from published work, if they mean not too much and cannot be used to refute your own data.

One point especially to be noted is that graphs must be fully labeled. Do it as if your life depended on it. Put all the information you can think of on the graph—the name of the experiment, the details as to the specimen of material, the name,

(Continued on page 44)

SAMPLE LAB REPORT

If you can do this well, there's no reason for you to stay an undergraduate.

DATA SHEET			
	Oil A	Oil B	Oil C
I. Cloud point first appeared complete clouding	16°F 13°	none	blew up
II. Pour point	+1°F	-5°F	blew up
III. Flash and Fire Points flash	372°F	361°F	blew up
fire	433°F	414°F	
IV. Carbon Residue	0.0789%	0.021%	blew up
V. Viscosity, Saybolt Seconds 80°F	380	710	blew up
150°F	75	160	
208°F	48	50	
VI. Viscosity Index	103	25	blew up
VII. SAE Number (see table)	10	30	blew up

OBJECT

The object of this experiment is to study the materials furnished, to determine their properties and characteristics, and to draw conclusions as to their suitability for the purposes intended.

APPARATUS

There were test tubes, burners, ringstands, pokers, tongs, retorts, and beakers. In general, the heavy objects were at the bottom. We used everything but the pokers, but we had fun quenching them in the bottle of benzene provided for us in the lab. This part of the experimental procedure was strictly on our own.

PROCEDURE

We placed it in the thing with the gage attached to it. Then they went around until a helix was formed and it broke.

DISCUSSION

The graphs on page 10 rise and

fall like the peacefully undulating waves—in the last report. They show the variation of the ordinate as a function of the value of the abscissa, except on the other plot.

No data from the literature were available, so we made some up and plotted them on the back of the report cover.

In general, we found that the literature data agreed pretty well with our own, especially at the origin, which seems to be the only point on which all experimenters agree.

We paid no attention to the graph. Our results stand or fall with last year's reports.

CONCLUSIONS

Oil C is pretty stinko. Some of the boys don't even think that it is an oil. It's slippery enough. The machinist is extremely sensitive about having oil spilled on him through the hole in the floor. We got along well after we locked the instructor out. Ford, Madox, and Hueffer found intergranular corrosion in distilled water, but they probably didn't use *pure* distilled water. Merkle is wrong.

INSTRUCTOR'S TABLE OF SAE NUMBERS

INSTRUCTOR'S TABLE OF SAE NUMBERS		Saybolt Viscosity Range	
		0°F eastbound ¹	130°F westbound ²
lv	10W	5000-10000	
ar	SAE 10		90-120
ar	20W	10000-40000 ⁴	
ar	SAE 20		120-185 ⁵
ar	30		185-255 ⁶
ar	40		255 ⁷ —
ar	50		—80
ar	60		80-105 ⁸
late	70		105-125 ⁹
			125-150

1. No checked baggage to this station
2. Runs Hallowe'en only
3. Mech Lab Express
4. Julius Caesar Special, March 15 only
5. Connects with Detroit, Toledo, and Ironton R.R.
6. Via Amarillo
7. Read up
8. Read down
9. Cross-eyed sloth, no toenails. See 15 down.

Camp Cornell Celebrates Centennial

By PROF. ARTHUR J. MCNAIR

It is quite appropriate that the celebration of the seventy-fifth anniversary of the Civil Engineering Summer Camp on Cayuga Lake comes during the same year that engineers throughout our country are celebrating the one-hundredth Centennial of Engineering. Of course, since the first camp was held in 1874 there may be some skeptics, or some mathematical wizards who will hurriedly subtract 1874 from 1952 and fail to get 75. Next, because they are not sure if the numbers are inclusive or exclusive, they will juggle one at each end. After all, does the day you were born count as your first birthday? And, when you celebrate your 75th birthday, are you 75 or are you starting your 76 year? Still failing to get 75, even by subtraction of one at each end for a total of two, they will claim that engineers at Cornell no longer know how to count. Now a number of the professors would heartily agree to this if it applied only to the student. However, you know that figures never lie and in this case, it is the historians that figure the record.

Oldest Required

Since the best substitute for experience is experience itself the idea of a practical summer survey course in the civil engineering curriculum was proposed and put into effect by Dean E. A. Fuertes. The first camp was held for the junior and senior classes for a two-week's period at the end of the Spring term in 1874. The railroad along the east side of Cayuga Lake was just being completed, and the students and faculty occupied a railroad boarding house as living

quarters. It might be noted that the song "I've Been Workin' on the Railroad" became popular shortly after this camp. This was the first summer survey camp held in the United States, although during the same summer the University of Michigan also inaugurated this summer survey camp. Camp Cornell has always been a required course for all civil engineering graduates, whereas it is understood that Michigan camp was not always required and many students graduated without benefit of the liberalizing influence of camp.

In inaugurating the summer survey it was decided to do original work that might be of some permanent value. There was no suitable map of Cayuga Lake available and many Cornell students wanted to fish during their spare time. They wanted to know how deep the lake was in different places so as to plan the most efficient and profitable fishing expeditions. It was accordingly decided to make a survey of Cayuga Lake and a planimetric survey of lands adjacent to the lake. This occupied the efforts of the engineers for the first five years (through 1878). It was such a successful project that it was decided to survey others of the Finger Lakes of Central New York. Consequently, from the years 1879 to 1883 sounding and surveys were made on Seneca Lake. From 1884 to 1888, Keuka Lake was surveyed. Next came Canandaigua Lake in 1889 and 1890, followed by Skaneateles Lake from 1891 to 1893, and Owasco Lake in 1894, 95, and 96. Finally in 1897 Otisco Lake was surveyed. By this time the classes were getting larger, the instruction and methods were im-

proving, and the lakes were getting smaller so that only one year was required to complete the survey of Otisco Lake.

Watershed Surveys

Following the surveys of these lakes it was decided to undertake a survey of Fall Creek watershed to determine accurately the drainage area above a gaging station at Forest Home. This project was useful because the City of Ithaca was in need of further water supplies and no survey of the watershed had previously been made. At the same time, it was decided that the seniors would soon be getting plenty of practical experience out in the cold cruel world and the time for the student to get experience was in the junior year. Hence, camp was made four weeks in length, following the junior year.

The Fall Creek watershed occupied the attention of the embryo engineers from 1898 to 1907. In 1908 the Cascadilla watershed was surveyed and mapped. This provided the University with a map of the area from which its water supply is derived. From 1909 to 1912 the engineers worked on the physiognomy of Six-Mile Creek watershed.

About this time the number of co-eds increased and it was discovered that the survey of Cayuga Lake and environs was not sufficiently complete. More and better picnic sites were needed. The map of 1874-78 was too small a scale and the topography along the shore had not been taken, only the planimetry. Furthermore, there was now more incentive for swimming parties so it was decided to also

(Continued on page 40)

CAMP CORNELL

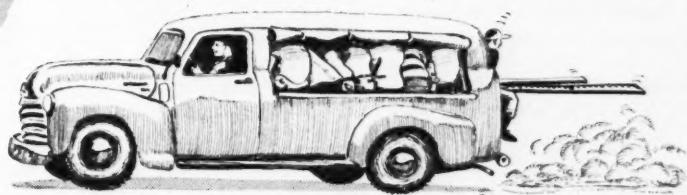
CAYUTAVILLE, NEW YORK



"TO MAP.....
OR NOT TO MAP?"



"A LEVELING PARTY OUT IN THE HOT SUN"



"PARTY NO. 4 RIDES TO WORK"



"A NIGHTLY, COMPULSORY COMPUTING PERIOD"



"PROF. SPRY'S SNAP-
SHOT OF ME....."

STANLEY PHILIP CORVIN CE '52

TEMP DORMS ARE HERE TO STAY

By ALLAN COBBLEMAN FLUGELFINK, EE '52

"And what," asked the bright-eyed frosh-to-be, "was the closest to your heart while you were at Cornell?" The young grad puffed on his pipe and gazed thoughtfully out across the valley. Had it been the football games, the Libe chimes, swimming at Beebe? Was it the evening bull sessions? The House-parties? No, he mused. It was Dorm Six. His home. He would miss the homey smells and sounds so close at hand. He would miss the feeling of security from the walls so close at hand. And he thought of the frosh-to-be, wasting away in Boldt hall. "Poor kid," he mumbled.

Temporary buildings have long been a part of Cornell's heritage. As early as the turn of the century the tradition was rooted in Franklin Annex. It has served father, son, and perhaps grandson for over fifty years. An air of mellowness has risen from its plank floors and cardboard walls that seems destined to last out the century. Someday Franklin Annex will rival even the buildings of Oxford and Cambridge in antiquity.

To carry on the proud tradition, Cornell now has its temporary dormitories. Of radically new design, the buildings are well worthy of public notice. Many new and novel features have been incorporated for the comfort and safety of the students and other occupants.

Safety the Keynote

A keynote of their design has been safety. The University realized that students could injure themselves while banging their heads on the walls. Therefore, the walls were made of specially designed material that gives under the slightest pressure. These walls work on the principle that it is far better for the wall to give way than the student. This has proved admirable foresight, as students living in the temp dorms bang their heads on the walls at an alarmingly high rate. The new material has also reduced the amount of scribbling on walls.

First, a student may more easily leave his fistprint (the current collegiate rage at Cornell), and second, there is a continually diminishing amount of wall space on which to write.

Construction Details

The outer walls of the building are, of necessity, stronger than the inner. Added support is needed to hold up the ivy the University someday plans to grow on these walls. For this reason, they are made doubly thick. This, of course, confines student movement to a considerable degree. It has been proved by experiment that no student weighing less than eighty-five pounds can force his way through them. An adequate number of doors has been provided for these unfortunates, however.

The close ties and comradeship

developed while living in the temp dorms cannot be underestimated. It is hard to ignore your neighbor when he may stick a head or a fist through your wall at any moment. The varsity football team, it is said, was put in the temps during summer practice to develop *esprit de corps*. We are told the experiment met with complete success; the first string cut doorways between their rooms to make one long suite.

This closeness between students is further promoted by the fact that the walls transmit sound with 99.8% efficiency. Thus your neighbor's every cough and sneeze becomes a part of your life. You can hear a razor from one end of the building to the other; not just an electric razor—any razor. It is possible for students to compare their homework answers without leaving the privacy of their own respective

Luckier students in temp dorms share two-room suites like this.





The University has been very careful to arrange the rooms in the temporary dorms to allot each student ample study space. Above eight students take their places for evening study period.

rooms. (This must be well organized and run on a set schedule to avoid confusion and handing in the answers to the wrong course.) It has been hoped that the walls would be transparent, too. However, they proved to be too thick, and only shadows can be seen through them.

Unfortunately, the walls are also extremely inflammable. In a time trial in 1946, one dorm burned to the ground in twelve minutes flat, a record matched only by Morse Hall and the better hotels. In order to prevent the spread of fire by air currents, ventilation has been all but done away with. Each room is equipped with a well baffled transom approximately two inches square. There is also one window per room, cleverly designed to appear openable. In actuality, of course, it can not. The result is that by late October there is insufficient oxygen remaining in the building to sustain any kind of combustion. The characteristic blue coloring of the occupants is an unfortunate but necessary by-product of the program.

The dorms are heated by extensions of the hot air lines from Goldwin-Smith and Rockefeller A. The radiators, designed by the local tailors' union, consist of sharp metal fins tacked onto lengths of heavy pipe. They are strategically placed so as to catch jackets, shirts,

and pants, thereby supporting the Ithaca tradesmen. A modification of these radiators is being used in the new low-temperature laboratory, and can obtain a temperature only few degrees above absolute zero. A novel idea was employed in connection with the temperature regulation system. Reversed thermostats were used, turning on the heat when the temperature went above seventy, and vice-versa. Reactionary students have thwarted this system by alternately applying blow torches and ice packs to the thermostats.

Rooms Carefully Furnished

Each room has been carefully furnished; bed, desk, chair, locker, and students are all accounted for and have their allotted space. In some cases the student's space is vertical, in others, horizontal. In no case is a student required to live in a slanting position. Tolerances as close as a hundredth of an inch are not uncommon, and in the case of stout students, a force fit may even be achieved. This careful planning prevents the student from cluttering up his room with superfluous articles such as books, pencils, and other students. Pin-ups and calendars are also unpopular, as the space they take up can often be put to use in other ways, such as allowing the student to inhale if he so desires.

As the temporary dormitories have gained in student popularity, it has become increasingly hard to obtain a room in one. A lottery system has been worked out by the Department of Residential Halls, whereby students drawing high numbers are given preference.

The University has steadfastly refused to add new dorms, feeling that no modern structure could achieve the subtle charms that make the temporaries what they are. Instead, they are planning to double the capacity of the present buildings. Over the summer, new floors will be built four feet above the existing ones, thus making two stories where one now exists. It is hoped that this will satisfy the demands for quarters from the present students, and possibly even allow room for a few freshmen. But, whatever happens, we can rest assured that the simple, stately lines of the temporary dormitories will grace the Cornell campus for many years to come.

THE AUTHOR

Cornell seemed to be a logical choice for Allan Cobbleman ("urp") Flugelfink, since every other college and seminary in the country had rejected him. Electrical Engineering attracted him because in his foolish youth he had jammed his hand into a light socket, and ever since then he wondered why the lights went out.

Allan came to Cornell sixteen years ago like any other freshman, on the Lehigh Valley. His first three years as a freshman were like those of any other freshman. It was during those hectic happy years that Al learnt so much about the Clinton Bar that now everyone says of him "He's a good Joe."

Gefilte Phi, the honorary EE beer guzzling fraternity, welcomed Al with open arms and palms, after he passed the initiation test of drinking two quarter kegs of zinfandel and swimming around Beebe lake three times in December. As Al's fellow drunkards say "Al is an allright Joe."

Al first saw the light of day in Mickey's Place on River Street in Hoboken when a man looking like Ray Milland screamed something

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Prominent Engineers

THREE BLACK MARKS ON THE CORNELL RECORD

Cal O. Rimeter, EP '52

Cal O. Rimeter, an outstanding Cornell engineer, has continually displayed the superior mettle and polish which are necessary to his field. Born and raised in the slums of Brooklyn, Cal overcame the handicap of his environment and transformed himself from a fresh, ignorant, dirty kid into a fresh, ignorant, dirty man. To Cal the most important thing in life is Engineering Physics. A member of Tappa Kegga Beer honorary fraternity, Cal studies ten to twelve hours a day in order to maintain his position as first man in the EP school, by virtue of his 75 average. Quiet and unassuming, Cal modestly admits that ever since he realized the folly of being conceited, he has been the nicest fellow on campus. Cal's girl-friend, Lucy Dite, says: "Some of my friends say that Cal is completely no-good and not fit to be alive. I can't say I like him that well, but what girl can resist an EP? There's just something about their stooped shoulders, thick

Cal



glasses, and long uncombed hair that attracts the women."

Cal's plans for the future include fulfilling his 43-year obligation to the Air Force ROTC and then opening up a little poolroom of his own where he can experiment with conservation of momentum, reflection angles, and left-handed English.

Isaac Newton, ME '53

Isaac Newton, a native of Dethen, Texas, was certainly destined for a career in engineering. As a little boy he found enjoyment in drinking beer, shooting pool, and making a general nuisance of himself. He didn't see much of his parents, for they would send him to school in the morning and then move in the afternoon. Despite the handicap of an unhappy childhood, or perhaps because of it, Isaac was determined to lead a full life, and thus he quit school in 1941 and joined the Japanese Navy. After the truce he searched the United States for a place to get an education, but he finally gave up and decided to come to Cornell, where he majored in Home Economics, finding time also to be active in CURW and on the knife-throwing team. After three and one-half years of Home Ec, Isaac discovered accidentally that a slide rule was good for picking locks, and he decided to transfer to ME to complete his education. He managed to get through his first two years of ME by baking nice things for the professors, and then one day it happened—he ran out of flour. Undaunted by this major catastrophe, Isaac staged a miraculous comeback and proved his worth as an engineer by designing and building a completely automatic bicycle clip.



Isaac (on left)

Isaac's hobbies are killing dogs, pushing coeds into the gorge, and setting off H_2S bombs in Baker Lab. (Maybe you've noticed.) Isaac has no definite plans for the future, but we know that he will be a success in any endeavor, and we predict that the name Isaac Newton will someday be famous in engineering circles.

Hy Voltage, EE '52

It is not often that we find a man like Hy Voltage on a university campus. A man of ambition, talent, and personality, Hy was born and raised in Wireland, D.C., and educated at Ampere High School. He enrolled in Cornell in 1946 as an EE, but he promptly obtained permission to double-register in the Arts College, because of a sincere love of the humanities, which he acquired from reading detective stories while waiting for his radio to warm up. During his summers he attended the Pre-Med, Pre-Law, and Hotel

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THE ENGINEERS' LOUNGE

By CONSUELLA ALTFARB, ChemE '53

A bedraggled frosh M. E. stumbled out of East Sibley, still grimacing from having to get up for his eight o'clock that dreary Saturday morning. Turning right, he made his weary way to the one and only Engineers's Lounge, located in the depths of Sibley Dome. As he descended the steps and sprained his arm opening the door, our friend was greeted with a number of rather interesting scenes.

At that moment, one corner occupied by a married engineer, his wife and child, who, it seemed, didn't appreciate the fine facilities offered by the university to house veterans and their families in those beautiful buildings out past the Ag campus. Maybe they were just poor. They had an ice box, a stove and a crib, along with a few chairs and tables borrowed from the lounge. The kid was hot-rodding his tricycle around, just missing chairs, tables, beer cans and other obstructions too numerous to mention. His old man was just arising, while his mother was setting up drinks for the house.

In the middle of the room someone who resembled Sherlock Holmes in attire was kneeling on the floor, peering at some odd creatures through a huge magnifying glass. Upon closer examination our friend saw various species of ants, scorpions, caterpillars and other members of the bug family scooting over and under the floor and rug. The entomologist - exterminator soon got up, left, and returned with an armload of hammers. The M.E.'s present were then given the op-

portunity to use their Machine Tool's experience and began pounding the hell out of every bug in sight. Before long the place was ringing with hammer blows. The engineers soon managed to climb the ant hill and raise the flag of victory—the seal and serpent.

After things quieted down to a subdued rumble, our M.E. friend's sleepiness began to overcome him, so he groped for one of those comfy red couches. He found one and plopped down with a victorious sigh. But someone was already there. Yes, a fifth year man was there—had been, in fact, since the day before. (It seems that a favorite trick of the boys is to let their buddies sleep through classes.)

Coke Machine

A few minutes later the frosh

got up and decided that maybe a coke would be helpful. However, as the rule goes: Those who want cokes—those with no nickels. One gent he asked stopped him with a cold reply; "Where would you expect a Prof. to get any money?"

A rumble of complaints issued from the direction of the candy machine. It seemed that the boys were getting chocolate syrup instead of Hershey bars. Other effects of the heat were also noticeable. Those who were playing craps around the corner were down to their underwear; the Mrs. was boiling water on the steam pipe.

Picking up a newspaper, the M.E. was surprised to learn that the South had just surrendered to the North. Posters on the wall listed the advantages of a Model T Ford. Oh

Engineers relaxing in the old lounge enjoy freedom from summer's insects. Not one mosquito was known to live for more than 30 seconds in its fragrant atmosphere.



well. Perhaps the radio would offer some good professional entertainment. The record selection did not appeal to him; he'd heard it too often. He tried the radio itself and soon discovered that it was no plaything—the 110 volts didn't feel too comforting.

The Lounge Trick

Our boy decided to take it easy for a while, so he sat down at a table and attempted to do the crossword puzzle. But M.E.'s aren't too bright, and he soon tired of it. He leaned back in the chair (carefully) and presently was dreaming of various items which only an engineer can dream of. When he woke up, he found that he had been a victim of the lounge trick. It was now 2:30. Rather angered at some of his classmates who had been there with him, he stomped out past the fifth year man and went to get something to eat.

(Throughout the week our friend was pestered by several people asking for donations to improve the lounge. But after his experience with that place last time, you know what he said about it.)

Surprise!

One week later, still with weary countenance, but this time with a look of spite in his one open eye, the M.E. headed for the lounge at



Engineers relaxing in the congenial atmosphere of the new lounge while waiting for floor show to start. Note absence of bodies on couches, cocktails instead of beer cans. Students must supply own cigars.

ten of nine. As he opened the door and stepped inside, something out of the ordinary penetrated his dulled senses. Lo and Behold! His closed eye opened with a jolt as he looked around the lounge. No longer did his feet squash milk, candy wrappers and beer cans; in fact, he jumped back rather embarrassedly off the plush carpet with his muddy bucks.

New and beautiful painted walls extended up from the carpeted floor

to a ceiling which no longer revealed the structure of Sibley and of the heating system. The old red couches, which were a perfect mold for a casting of the masculine back, had been replaced. For those whose somnolent desires were not satisfied by a night's sleep, there were a few bunks around the corner, equipped with alarm clocks. A grand piano rested majestically in the old upright's place, and was

(Continued on page 48)

ABOUT THE AUTHOR

It is certain that she is not Consuella.

Although born in Trumansburg forty-eight years ago, Consuella (just call me Sue) has called Syracuse her home town all her life. Consuella attributes her dawdling interest in chemical engineering to the fact that her father, an itinerant chimney sweep, badly needed someone to support him. Consuella was a legacy to Cornell in 1896. (Maternal side, Eunice Blmnpf, H.E. '70).

—In spite of the difficulties of being a woman in a man's field, Consuella's college career has been less than remarkable. It has been positively dull. In her first year (1912) her avarage soared somewhere around 69.8 which her chug-aluging speed decreased from 0.29 secs. to 0.13 seconds. After eight years of college her average rests around 69.9 while her drinking speed has decreased to 0.098

secs.

When we interviewed Consuella we found her deeply engrossed in her studies. These she changed for a pair of pajamas. Despite her scholarly attitude Consuella is quite the girl about campus. She is a member of Pie Almodia, the female engineers' honorary hen party. She belongs to the American Society of Female Engineers, is local commissar for the American Society for Teasing Males, (the ASTM you hear so much about in Sibley), is a leading spark in the Cornell Association for the Advancement of Retarded Students, and her favorite hobby is chewing tobacco.

Consuella's favorite course is stoichiometry which she has taken forty-two times. As Sue herself says "It ain't the subject matter which keeps me in de course, it's the perfesser. Dusty is like a brother to me. He never speaks to me."



Sue

Technigriefs

Static Strikes Back

As all good little engineers (or those who survived P 115 and P 116) know, a body may accumulate charge by processes arbitrarily termed "conduction" and "induction" (not to be confused with the military term).

Now it just so happened that a certain professor had gotten warmed up to this conduction-induction topic on May 6. There follows a first-hand account of one Julius Q. Bird-dog, the only surviving witness of the lecture demonstration:

"Waal, ya see, us igerant enchuners was tryin' to catch a little shut-eye before the daily Ivy Room scrimmage, but the perfesser give us some stiff competitishum. Got all het up about somepum called . . . les' see . . . 'ecitipants,' I guess it wuz. Anyways, the hour got longer and longer and I got tiderer and tiderer. Things wuz pretty stuffy . . . Guess the air condishunr wuz on the bling. The perfesser wuz jus' tellin' how the mashine—the Vandy Graph generator—works

. . . how little charges wuz bein' carried up to the big globe. Some of the elektrisy wuz 'posed to leak off, but alcohol fumes really must do somepum to this here "dylektrik constint," 'cause first we knew the perfesser gets too close to the colyum and then . . . Boy, it wuz jus' like Superman takin' off—It's a bird, it's a plane . . ."

Did the professor survive his harrowing adventure? Has one of the basic laws of physics been violated? Will the pigeons return to Goldwin-Smith? How should we know?

Pizza Machine

Once again, a remarkable new invention has come from the laboratories of Prof. Weightless F. Pulley of Yokahama Tech. Prof. Pulley has announced the creation of a pizza-making machine. To all of you who have waited endless hours at your favorite pizza emporium for this luscious tomato sauce and cheese concoction, this means valuable time saved. (Mr. U. Tectic saved 84 minutes this way, and decided to attend a movie

in the time saved. While crossing the street in front of the show, he was run over.)

This lovely machine cuts the pizza into accurate dodecahedrons, and even places an anchovy at the centroid of each piece.

The pizza machine promises to affect the destiny of mankind even more than Prof. Pulley's last contribution (for which he was awarded a Nobel Prize), a pimento stuffer for olive factories.

F does not equal Ma

Eng. News Service, Ithaca, May 6, 1952

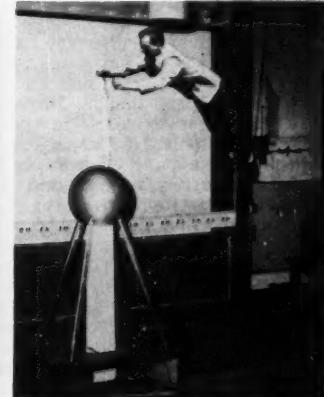
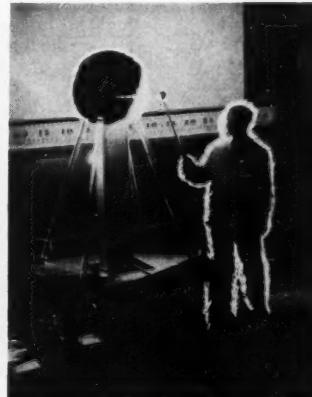
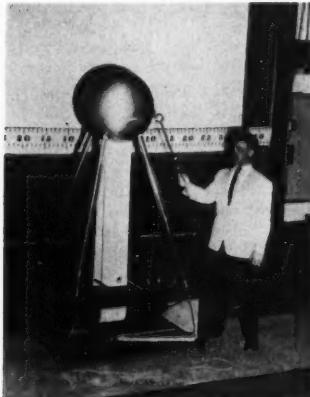
In Rockefeller Z at 11:23.07 (Greenwich) this morning, Professor Flexible E. Shaft noticed that for 0.896 microseconds, F did not equal ma.

Consequences of this earth-shattering event were felt around the world.

At the University of Kasama in Kasama, Northern Rhodesia, Home Economics students noticed that eggs balanced on the smaller end.

(Continued on page 32)

Professor Oldroom gets a large charge out of the Vandy Graph Generator. This experiment worked well for years. Campus Patrol now investigating calamity shown here.



CORNELL SOCIETY OF ENGINEERS

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1951-52

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"The objects of this Society are to promote the welfare of the College of Engineering at Cornell University, its graduates and former students and to establish closer relationship between the college and the alumni."

This issue of the engineer is a funny one and yet it is one that has its serious aspects too for it raises a lot of questions, such as how funny is it to be serious or how serious is it to be funny, and when you apply that to engineers you really cooked yourself up a first class issue and one that we must settle before we jump from the frying pan into the fire. You can't let a thing like an issue cook for too long, for when it does it may get hard boiled and then it is hard to digest and just won't settle. In fact it may turn into the kind of an issue that comes up again and again and leaves a sour taste in your mouth. But settling issues and settling engineers are horses from two entirely stables and it is hard to tell which combination will win the daily double. Issues may come and issues may go but engineers go on for ever—that is why they are harder to settle.

I don't know whether you have even had that experience yourself but you have to go thru it personally or else you won't know what I mean. And I don't mean maybe. Maybe is not a word that engineers can allow in their vocabularies. There is no such thing as maybe. It either is or it isn't in the pure engineering sense and you have to make up your mind one way or the other. There are no two ways about it. There is only one best way but that is hard to determine and you won't find the answer in a handbook or in a set of tables or from those figures that are on the back of your slide rule. You must know your stuff or you will never reach the answer. That is the foundation of all good engineering. It is the base on which engineering education is premised. It is why you have been sweating it out for all these years to get your degree. And yet it is not a matter of degree at all. It is a matter of prin-

ple and if we don't have principle we have nothing. Without principle there can be no interest and I don't mean that as a pun either for I can't stand puns. I mean it as a fact and facts don't lie. They say figures don't lie but that in itself is the most preposterous lie of them all. It is only facts that don't lie and never forget that in the hand is worth two in the bush. The whole basis of settling this issue will be getting at the right facts. They are hard to get at. You can't just leap out at them—they are sometimes timid things and you may frighten them away. You have to set a decoy of maybe a phony fact and then all of a sudden you find yourself in the midst of a flock of real live ones and then bang—what do you find? You find that you have facts all over the place—so many that sometimes you don't know what to do with them all. It is a predicament. It is puzzling. It is bewildering how to arrange all those facts in just the right order to bring beauty and symmetry out of chaos. But you can do it if you have courage and determination and the proper intellectual background and training which comes from just these kinds of years of study and concentration which you are now passing thru or vice versa.

That is what makes for that kind of understanding to which I referred earlier. So few people understand Einstein. Modern art is similarly enigmatic to the uninitiated. But I am sure that with your five years of broadened background you have followed the straight to the point manner in which we have settled this issue of the ENGINEER by letting you taste the abstractions of the new science of "modern expression by deviation" which is at times obscure to those who have not seen the light.

FREDERIC C. WOOD

THE CORNELL ENGINEER



Frederic C. Wood

ALUMNI NEWS

Commodore George T. Magellan, Aero.E. '83, has decided not to continue his projected trip, and has settled where he last landed. He lives with his wife and three charming little scurries at 1108 S. San Jacinto Blvd., Tierra del Fuego.

C. W. Roentgen, M.E. '85, has discovered some rays which he has not yet fully studied. They are exhibited to laboratory visitors as a curiosity in order to pay for his important experiments on the microstructure of butterfly wings.

Timothy O. Mendeleyev, Chem. E. '86, announced recently the discovery of what seems to be a regular periodicity of the chemical elements. He does not expect it to be much help in the study of chemistry, however, and thought it up for the amusement of his young son Ostwald.

Anthony G. Archimedes, E.P. '88, of Syracuse, wrote and produced a short Greek play last month entitled "Eureka, Eureka," or "I Have



Anthony G. Archimedes

Found It," after which he was arrested for indecent exposure.

Hubert Bicklefoot, C.E. '03, was elected President of the United States at the last election. He intends to have better relations with everybody, and will appoint many

Cornellians to top posts in the Treasury Department.

Oscar Fleet, C.E. '10, has been released from the Atlantic Penitentiary after serving twenty years of his sentence for embezzlement and general untrustworthiness. He received no time off for good behavior.

Hubert H. Hubert, E.E. '15, of London, England, has been elected Prime Minister. He will preside over the dissolution of the British Empire and will succeed Winston S. Churchill, who did not take office with that job in mind.

The Bureau of the Census reports that, in Ithaca, there are more people than anybody. Press Agent for the Bureau is **Honorarium I. Scriblum, Arts '51,** who further states that this will continue to be the case for the next several years unless something turns up. Scriblum reports that this condition seems to be prevalent in the East, and is at a loss as to how to account for it.

Ali Upe, M.E. '18, has been appointed Chief of the Upward Division of the Oats Elevator Company; he makes his home at 1000 East Buffalo Street, Ithaca.

T. S. Blows, Chem.E. '27, who has been Chief Press Agent of the Census, recently resigned and went into retirement, charging that incompetence in the Bureau so undermined his nerves that he could continue no longer. Associates assert that his underlings have been publishing reports without his approval, and that some of them are misleading the public and are causing hysteria in various parts of the country, principally in the East.

Gabrielson McGrath, C.E. '32, was recently arrested for violations of the Mann Act, the Woman Act, the Smith Act, the Jones Act, the Taft-Ellender-Wagner Act, and the Smoot-Hawley Act.

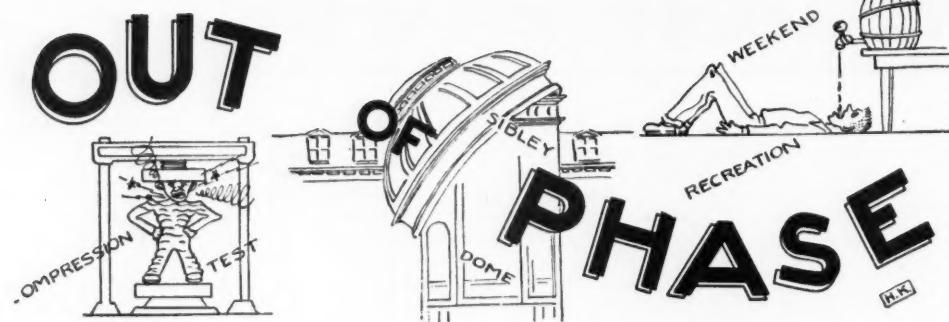
3406672, Arts '38, says that he has at least found the peace and solitude he requires for the composition of his poetry. He writes from his secluded home that he is willing to receive letters if they are written with washable ink on 8½ by 11 sheets of all-rag paper. Being short of funds, he intends to publish his next book with this material in the community print



3406672

shop. Also if several people will write him on parchment, he will be very grateful, as he will need material for the binding. Address all mail c/o Warden, Dannemora Prison.

H. H. Dillinger, B.E.E. '48, has just assumed command of the Montana State Prison for Incorrigibles. He says that since his arrival he has met almost numberless quantities of Cornellians, and they have together organized a Cornell Club. Indeed, he says, there are so many of them there that he has written to the Alumni Office of the University for its opinion on holding the annual reunions there. Ballots will be distributed shortly on which alumni are to mark their decision. Dillinger says to mark these blank pieces of paper "No", as the Alumni Office has a peculiar way of wording things. He wishes you all a Merry Christmas.



By HERBERT F. SPIRER, B.E.P. '51

When I first came upon the vast hulk reclining on the autoclave in Dusty's office I wondered what it was. After making its acquaintance and discovering that it was none other than Vladimir Sitzflesch, I wondered why it was. "Yawk," said I, "You look especially attractive this morning with those tension specimens dangling from your nose. Obviously 1020, but are they cold or hot-rolled?"

The reply was slightly muffed, coming as it did through a nasal forest of carbon steel, "Neither, Throckmorton, I roll my own exclusively. . . Now that I have you trapped as inescapably as if I were taking attendance, let me enlighten you as to what really goes on in the office of the College of Malengineering, three sub-basements below the gaudy tinsel of Sibley Dome."

Thus began one of the most fantastic true tales I have ever had my ear channels reamed out with. Sitzflesch speaks. . .

"Being the only child of a family of forty-two, I have always believed in live and let live. I am walking erratically over the ice (it is only June) from the East Mech Lab to Sibley, when out of nowhere comes this elephant with a wingspan of about twenty-two feet. Before I can count the notches on his tusks, he flattens me to the ground with his left paw and plays jacks with my head with his right paw. By the time he has romped off to G. S. to play mashed potatoes with some Philosophy grad student, I feel like Martin Kane,

Private Eye. Not only do I not feel my left leg, but I do not even see it.

"With ease I recalled what they told me as a freshman. 'The Campus Patrol is your friend, not your enemy. They are here to protect you from the foul creatures that prey on poor students. Be friends with the Campus Cop. You may be the only friend he has, etc.' So I drag my shattered remains to one of the free telephones the university has carefully installed for student's convenience on one of the antennae atop Franklin. I dial the number and within two hours I am speaking to the Campus Patrol, represented by a sweet feminine voice, dripping with sugar and syrup.

'Halp,' I says, 'I have been mortally wounded in Sibley Court.'

'Aha,' she replies, 'Are you a student?'

'Yes.'

'Did you park there?'

'No.'

'Well then, there is nothing *we* can do to you.'

'I am never one to be put down a small setback. Stopping for a blood transfusion from one of the large dogs on campus, I make my way back to Sibley. Several Professors lean out of windows to encourage me by throwing powdered glass and boiling lead in my face. They are raucous with laughter.'

'Look at him! Another log upon the fire. You will learn to go into the court when the Director's elephant is there. What's the matter son, can't you tell an elephant from a hole in the wall?'

'Which Director could they mean? CE, ME, or Dusty? No, it could be only one person, Director Schmockiester of the Sibley School of Malengineering—the only educator known to collect both pastry shells and African elephants. I drag my mangled body into the plush office two levels below the Engineer's Lounge. The Director's third undersecretary in charge of outside activities peers at me over a solid ebony desk which is inlaid with right arms of students who have been allowed to get off pro, and says demurely,

'Get off that carpet, you mangy undergraduate, before you get a speck of blood on it! This is a departmental office, not to be cluttered up with worn-out students.'

"Meekingly clutching the top of my head in my teeth, I back off the carpet until I am huddled in a far corner of the room behind a large waste-basket marked 'Unopened Petitions from Students.' My back is up against an even larger wastebasket marked 'Applications for Scholarships from People who *really* Need the Dough.' As I cast my eyes about the room (they are lastest thing in trout flies), I see that the room is full of similar wastebaskets which are being filled by secretaries and emptied by janitors at a fabulous rate. Another of the labels is 'Rotary File for Entrance Applications Unaccompanied by Cash,' a very touching and noble sentiment.

(Continued on page 46)

THE CORNELL ENGINEER

COLLEGE NEWS

Keep up with the world with the
Cornell Engineer's survey of campus events

Colgate Students Executed

A group of marauding Colgate students visited Ithaca in late February and stole into the animal barn on the Ag campus. They destroyed five cockatoos, a pheasant, a muskrat, three pigs, two gophers, and the world-famous ferocious Cornell Bear, which was sleeping quietly in its cage.

The malefactors were apprehended by the swift-acting Campus Patrol, which was called when several strangers offered pheasant and bear meat to the Straight cafeteria at prices lower than those usually pegged for Ithaca.

Angry sentiment in the Administration, incensed at the destruction of the prize gophers, caused the trial to be placed before the toughest and most inhuman tribunal on the campus—the Women's Self-Government Association. They were sentenced to death after offering no defense except indigence, which is not recognized in Ithaca as an excuse for anything. After spending several days in the dungeon in Barton Hall, they were taken out one morning and shot by a picked group of Pershing Rifles.

War on the Quad

A group of 250 Arts students, enraged at a small party of surveyors who were driving stakes into the Quad, rushed them, endeavoring to drive them off. The professor in charge blew his whistles, sonic and supersonic, and groups of Civil Engineers and campus dogs came running to the scene.

At first the CE's were pushed back into the woods near Lincoln, but they rallied and began a determined march across the Quad. The melee continued until 7 P.M.,



Everyone loves a parade! Here are five engineers watching annual ROTC Review. All are ChemE's except one at far left, an ME. They watch from Infantry Social Organization's special stand—Lock, Stock and Barrel Platform.

when darkness came over the combatants. They severally camped and posted sentries along the frontiers. Scattered patrol action during the night brought about no change in the lines. In the early morning, as the fighters were about to engage, three psychology majors rolled up in a sound truck and began calling on the engineers to surrender. The platoon of green-clad architects retaliated by rolling out their own loudspeakers, and led the engineers' advance with a barrage of rockets, firecrackers, and Roman candles—tactics for which they are justly famous.

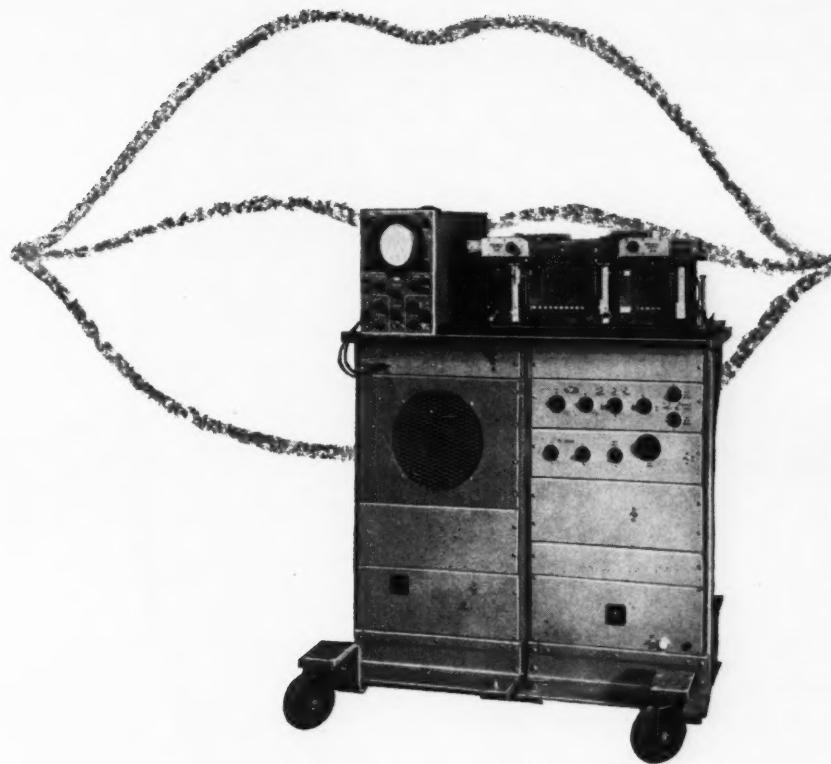
A mixed group of Pershing Rifles and Campus Patrolmen who were coming to rescue the Arts students from what seemed certain defeat were easily beaten off by a small group of campus dogs led by an EE.

At the height of the conflict, there were about 800 fighting men present, the numbers about equally divided. Late in the afternoon the

two deans of the respective colleges arranged for a truce. The engineers claimed the victory, as they had just taken and sacked Goldwin-Smith Hall, which caused the Arts students to lose courage, this being sacred to them. The two groups concluded a treaty of non-aggression to last for the rest of the school year, although a group of reluctant ME's was heard to say that the ChemE's, who had been aloof as usual, could have attacked the Arts students from behind and brought about a positive victory.

Roads Blocked

Three surreptitious persons were spotted the night before Engineers Day, dumping barrels of soap in Beebe Lake. Apprehended by the ever alert Campus Patrol, the three turned out to be Chemical Engineers, apparently testing a new soap, "Dec," guaranteed to give valleys of suds. The experiment
(Continued on page 44)



-the mouth that'll never be kissed

Until Bell Laboratories scientists design an electric mouth that can pucker, the human model is here to stay. But we have built a machine that can imitate human vocal characteristics — from the slate-pencil squeal of a girls' cheering section to the basso rumble in a men's dining hall.

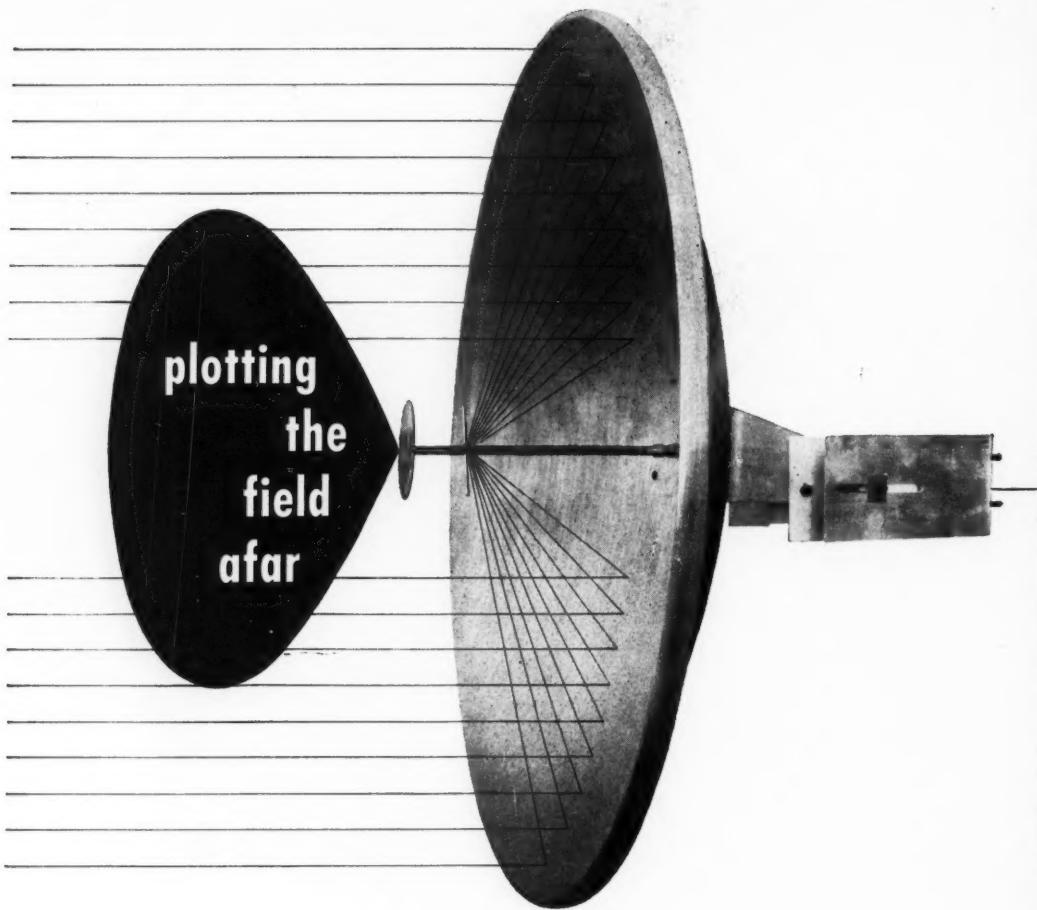
Sound being a basic raw material of the Bell System, we have pioneered in the science of speech. Measuring the properties of your voice leads to better and cheaper ways to transmit it.

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Your campus placement office will be glad to give you more information.



BELL TELEPHONE SYSTEM



Plotting the radiation pattern of a microwave antenna is typically time consuming and laborious. For some time, workers in this field have felt a need for a continuous non-manual means of performing this operation. The extensive microwave activities of its Research and Development Laboratories have created at Hughes a special interest in such automatic pattern-measuring equipment.

The first automatic machines that were at all accurate were of the fixed location type and weighed nearly a

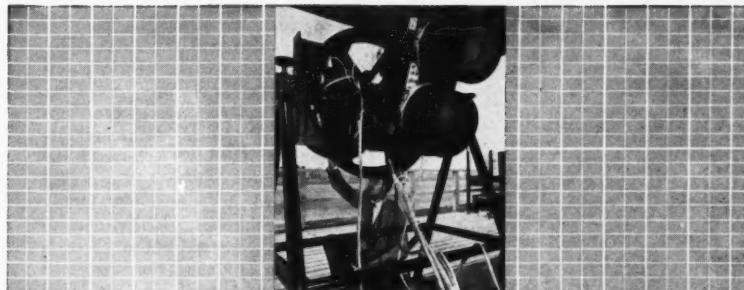
ton. The new Hughes recorder weighs just one hundred pounds, is more accurate, and has higher writing speeds than the earlier machines. Its recording range covers 80 decibels in the audiofrequency spectrum. The writing speed is approximately 25 inches per second, with an 8" x 11" plot, and the abscissa or angle scale is controlled by an electrical take-off system.

In the field of microwave measurements, this machine assists in determining many things—such as the correct shape of reflectors and the

proper location of feeds. The development of such improved laboratory tools is an interesting by-product of a large research activity, such as that conducted by the 3500 men and women of the Hughes Research and Development Laboratories.

The growing requirements of both the commercial and military electronics programs at Hughes are creating new positions within the Research and Development Laboratories. Graduate students and senior men are cordially invited to address correspondence to:

**Hughes Research
and Development
Laboratories**
Engineering Personnel
Department
Culver City, Los Angeles
County, California



Plotters. O. A. Tyson (left) and Dr. L. C. Van Atta worked together in developing this new machine at Hughes Research and Development Laboratories.

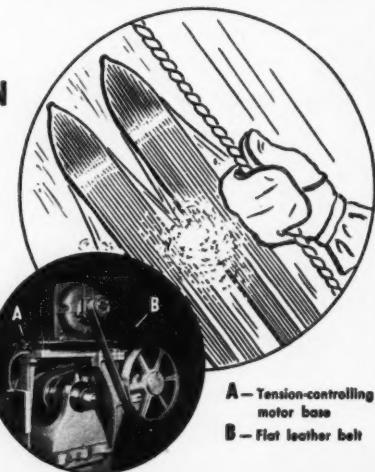
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The most complete line of ball bearings and power transmission units in America. The Fafnir Bearing Company, New Britain, Conn.



Technigriefs

(Continued from page 23)

The chickens noticed this too.

An explanation was offered by high-ranking officials of Her Majesty's Royal Grave Watchers. They say that at Uppington on the Fluppington Botanical Cemetery, located on the lower banks of the Loch Lomond River, a disturbance was noted in one of the family plots. In the Newton plot, next to old Fig Newton, there came a twitching sound. The esteemed grave watchers have concluded that it must have been caused by the restless turning of old Isaac.

The crisis quickly passed, however, and once more all is serene in Rockefeller Z. The professors are happy, for once more not only does F equal ma, but, making them jump with glee

$$Y \delta \tau^{-\frac{1}{2}} \ln \frac{\eta}{\theta^4} = \frac{\xi \sqrt{\cosh \psi} \sigma^{0.632}}{\tan^2 \lambda \sqrt{0.00657}}$$

There follows a first-hand account of the Rockefeller Z physics lecture of March 6, as reprinted from the *Cornell Review*.

The professor's voice rose from a barely audible drone. . . . "Potential energy. . . . kinetic energy . . ." to an exciting pitch as he reached the climax of his lecture. Students were nudged awake by their classmates; the cross-fire of spitballs and missile prototypes slowed and came to a halt; and over Rockefeller Z there settled a quiet hush broken only by the irregular H_2O seeping through the weather beaten roof of the institution.

Slowly the huge suspended metal sphere was drawn to the tip of the professor's nose. With the eyes of all glued upon it, the spheroid left its point of release, gathered speed as its potential energy decreased and passed through a wide arc (at the mid-point of which, according to hitherto commonly accepted theory, it possessed kinetic energy equal to $mg(h-h_0)$). Three hundred pairs of eyes watched the shiny object slow to a stop and poised for a horrible moment at the

(Continued on page 34)

I am Industry-1952

Ushered into a new world,
I had a bustling, brawling, bruising youth.
I was a potential giant awakening in a world of giants.
People were hurt when I first stirred in life;
Then I grew and learned;
Then I matured and knew that
Though I work with water and metal and chemicals and fire,
I am more than these things.
I am the people's work!
I am the people's dream!
I am the people!

With maturity, I have grown, too, in social responsibility
To the people,
To America!
And even to those beyond our shores.
My efforts are not in selfish interest;
Rather, all my brain and brawn strives for the good of the many.
I am the American way!

Now, I have sworn that these things shall be:
I shall deliver ever-better products to those who use my fruits!
I shall offer equal opportunity to those who work at my side
Whatever their race!
Whatever their creed!
Whatever their color!
Whatever their national origin!
I shall forever do my part to keep America great!

And why?
Because only in this way can I remain a healthy force in our free world.
For when I am healthy, America prospers
And tyrants tremble before my might.

I am America's life-blood!
I am America's strength!
*I am the bulwark of
the World's freedom!*



Technigriefs

(Continued from page 32)

height of its swing. Then 299 pairs of eyes (as one freshman slumped in his seat) watched the terrible instrument start its downward journey and saw it gain momentum as it relentlessly moved toward the stoic professor.

Then it happened . . . The spheroid, in defiance of all accepted physical laws, seemed to gain more and more energy. Too late the unbelieving professor saw his fate. There was a dull thud as the heavy object crashed against his cranium.

The paralyzed student body could only gape in bewilderment . . . and sigh at the loss of one physics professor, one blackboard, and one valuable pair of trifocals.

117th Element

Prof. Hevvy Wotter has just discovered the 117th element—a gas with very peculiar properties which threatens to invalidate many of the theories of the modern sci-



Jim Dandy Home Style Atomic Pile
entific world.

Prof. Wotter first suspected the existence of this gas when he noticed one of the fission products of his Jim Dandy Home Style atomic pile was behaving most irregularly. The red and yellow striped gas had purple polka dots instead of brown ones.

All-Purpose Circumstance

The noted scientific philosopher, Dr. X. Istentialism, has just announced the discovery of the all-purpose circumstance. This will literally save the lives of millions who previously wouldn't do things under *any* circumstances. They now have, thanks to the good Dr., irresistible all-purpose circumstances under which to do them, at cut-rate prices.

Extra Right Hands

The Jolly Science Apparatus & Pitchfork Co., a subsidiary of an international gumdrop cartel with headquarters in Perth Amboy, has recently made available a limited supply of extra right hands. These are intended for engineers whose hands have worn away through excessive use of the right hand screw rule. They are of the highest quality, and have anti-magnetic cadmium plated knuckles.

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Super-powered receivers, built on principles developed at the David Sarnoff Research Center of RCA, bring clearer television pictures to more homes.

New Super Sets widen television's horizons!

Although no new TV stations have been built since 1950, television's reach has been extended in *two ways*. In sections of cities where interference is a problem, fine pictures can now be seen. The same is true in rural, or TV "fringe" areas, formerly too distant for clear reception.

RCA engineers and scientists, to offset these limitations, developed powerful new Super Sets. In distant fringe areas, these sets boost a weak or faltering signal into a clear, steady picture. While in cities, where buildings and electrical

devices may interfere, this same super power—plus television's first double-shielded tuner—bring in TV at its best. The result is stronger pictures in the country and in problem areas, and better pictures than ever before in areas of normal television reception.

The new RCA Victor "Picture Power" Super Sets are examples of research and engineering at work for your benefit. This pioneering means finer performance from all products and services of RCA and RCA Victor.

See the latest in radio, television, and electronics in action at RCA Exhibition Hall, 36 West 49th St., N. Y. Admission is free. Radio Corporation of America, RCA Building, Radio City, New York 20, N. Y.

CONTINUE YOUR EDUCATION WITH PAY—AT RCA

Graduate Electrical Engineers: RCA Victor—one of the world's foremost manufacturers of radio and electronic products—offers you opportunity to gain valuable, well-rounded training and experience at a good salary with opportunities for advancement. Here are only five of the many projects which offer unusual promise:

- Development and design of radio receivers (including broadcast, short-wave and FM circuits, television, and phonograph combinations).
- Advanced development and design of AM and FM broadcast transmitters, R-F induction heating, mobile communications equipment, relay systems.
- Design of component parts such as coils, loudspeakers, capacitors.
- Development and design of new recording and producing methods.
- Design of receiving, power, cathode ray, gas and photo tubes.

Write today to College Relations Division, RCA Victor, Camden, New Jersey. Also many opportunities for Mechanical and Chemical Engineers and Physicists.



RADIO CORPORATION OF AMERICA

World leader in radio—first in television



APPOINTMENT WITH TIME

When you travel by train (or, for that matter, by plane or any public carrier) you expect to arrive on time. Unconcerned, you click-click across switches in the yard district . . . swish past the clang of grade crossings . . . roar by freights only a few inches away . . . Your confidence lies in experienced railroaders and properly maintained roadbeds and signal equipment.

Over every mile of track, your safe and speedy progress is guarded. Guarded by semaphores, position and color light signals, dwarf signals, automatic train controls, interlocking control machines in far-away towers, and other elements in an all-inclusive safety pattern.

An *unseen essential* in this safety pattern, reliable and hard-working, is *Synthane*. *Synthane* is a strong, light-weight, laminated plastic. It's an excellent electrical insulator, moisture and chemical-resistant, hard, tough and dense. It is also easy to machine. *Synthane* is a material for small parts or large on any job where a combination of properties is needed and good performance is a "must".

Maybe you can use *Synthane* profitably. To find out, send for the complete *Synthane* catalog. We will be glad to help you with design, sheets, rods, tubes or fabricated parts. *Synthane* Corporation, 10 River Road, Oaks, Pennsylvania.



Terminal Board (left) for continuous train control and relay pusher (right). Both pieces are made from *Synthane* laminated plastics for General Railway Signal Co., Rochester, N. Y.

Synthane—one of industry's unseen essentials

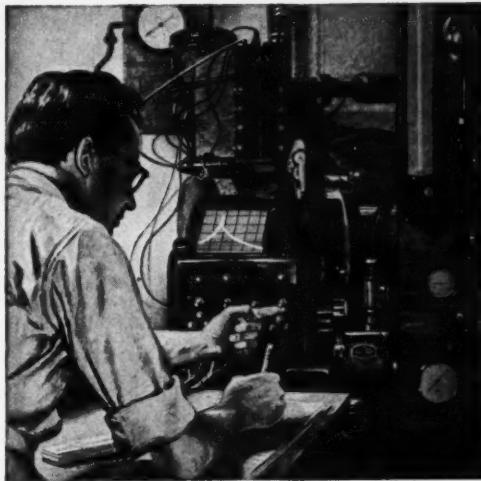
SYNTHANE
S

LAMINATED PLASTICS

THE CORNELL ENGINEER

Opportunities at General Motors:

*The difference between a GM job
and any other—for you,
the Graduate Engineer*



From the start, General Motors offers the engineering graduate both the opportunities and facilities of a large, successful organization, and the friendly working environment of a smaller company.

GM is not only a major producer of motorcars and trucks; it also is a leading manufacturer of many types of civilian goods, from heating systems to refrigerators, from fractional h.p. motors to Diesel locomotives.

And as a top defense contractor, GM is building everything from rockets and shells to tanks and jet and Turbo-Prop engines.

In these operations we require the services of all types of engineers, engaged in all phases of engineering work—from pure research to production supervision.

This work is decentralized among GM's 34 manufacturing divisions, operating 112 plants in 54 towns and cities throughout the country. Each division operates as an independent unit with its own engineering department. Yet each benefits from the resources of GM's central research and engineering laboratories.

That, then, is the difference between a GM job and any other.

Today many GM divisional managers are engineering school graduates. So are many others in top management. In fact, a high percentage of the engineering graduates who have joined General Motors have made sound business careers for themselves at GM, through their own hard work and initiative.

For further information on a GM engineering career, we suggest you ask your College Placement Office to arrange an interview for you with the GM College Representative the next time he visits your campus.

GM POSITIONS NOW OPEN
IN THE FOLLOWING FIELDS:

Mechanical Engineering • Electrical Engineering
Metallurgical Engineering • Industrial Engineering
Chemical Engineering • Transportation Engineering

See December 1951 issue of Fortune Magazine for description of new multimillion dollar GM Research and Technical Center in Detroit.

GENERAL MOTORS CORPORATION

Personnel Staff, Detroit 2, Michigan

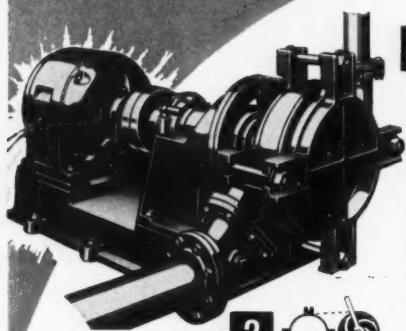


MORRIS

Type R Slurry Pump

Gives Longer Service, Less Trouble

because



1



No internal studs or bolts — no troublesome internal joints and fits. Suction Disc Liner is merely clamped into position between disc and shell. Fewer wearing parts mean less maintenance and longer uninterrupted service.



2

Impeller and shaft sleeve of the Morris Type-R Slurry Pump can be renewed without disturbing the suction and discharge piping or the bearings. This means considerably less lay-up time.

3



Due to the clamping effect of the bolts on the discs, the shell is not subject to high stress. Consequently, the shell can be made of a wide variety of materials, including those of high abrasive resistance. Yet these materials need not necessarily be of high tensile strength.

4



Hydraulic passages of the suction discs are extremely large and velocities are low. As a result, wear is minimized and renewal infrequent.

5



Write today
for free bulletin

Practical information in Bulletin No. 181 shows by performance curves just how the Morris Type-R Slurry Pump fits specific operations . . . describes exclusive construction features that cut operating costs.

FOR CHEMICAL OPERATIONS

Morris Type-R Slurry Pump handles mixtures containing ore concentrates . . . tailings, slag and residue from filters and classifiers . . . all types of caustic or acid mixtures containing abrasives or solids.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Branch Offices in Principal Cities

MORRIS

Centrifugal Pumps

Temp Dorms

(Continued from page 19)

about bats and jumped through the wall. The opening in the otherwise solid structure allowed sunlight to fall into Al's eyes for the first time at the age of seventeen. Being unaccustomed to sunlight, Al started to blink, which he has been doing ever since.

Al is on a State scholarship which he got with ease as he was the only one in his county to apply for it. Al's other scholastic triumphs were burning out two meters in



Allan C. Flugelflink

Electronics lab which he successfully switched into someone else's experimental hookup, copying twenty-five Materials Reports when blindfolded for an overall average of 96, flunking Pattern-making, losing two transits while taking Surveying, and setting fire to freshman chem lab by pouring sulfuric acid down the back of his lab partner's trousers.

When Al graduates he hopes to find employment manufacturing drip pans for grid leaks, pots for cathode flowers and geranium diodes, or else go into sales. Al feels that his fortune will be made when he starts selling nickels to put in behind burnt-out fuses for fifteen cents apiece. "Steinmetz told it to me when he was on a four-day bender in Omaha," says Al of his great idea, and somehow we feel that he might be right. As Al's friends, both of them, always say, "Al is a bright Joe."

THE CORNELL ENGINEER



Hitting modern military targets poses ever-new engineering problems

Increasing emphasis in speed and mobility in modern warfare intensifies the problem of destroying the target—takes it out of the reach of manual ability and into the realm of electronics. Electrical and mechanical engineering—of the highest skill and ingenuity—are required.

Since 1918, Arma Corporation has worked closely with our Armed Forces and American Industry in pioneering and developing equipment to solve such problems. Today, Arma is in the forefront in supplying these precision instruments for our nation's defense, through techniques which tomorrow can be widely applied.

34 YEARS OF LEADERSHIP IN INSTRUMENTATION

Vol. 17, No. 8

This booklet—"Engineering of Arma"—describes in detail the challenges of an engineering career at Arma. It can open new horizons to you. Write today for your copy to Engineering Division, Arma Corporation, 254 36th Street, Brooklyn 32, N.Y.



ARMA CORPORATION
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SUBSIDIARY OF AMERICAN BOSCH CORPORATION



Camp Cornell

(Continued from page 16)
take water temperature in the lake. From 1912 to 1927 a very complete map of Cayuga Lake was made.

Commencing in 1914 and continuing till 1935, the Forestry students were also in camp with the Civil Engineers and learned the practical methods of making surveys and maps. It has been rumored, however, that on some technical matters the foresters became "lost in the woods." Since 1912, students have gone to camp at the end of their sophomore year. The length of the camp period, in addition to the two weeks for two years, and the four weeks for one year during early years, has been variously four-and-a-half weeks, six weeks, and most recently five weeks.

Cayuga Lake Site

Upon completion of the survey of Cayuga Lake it was learned that the Conservation Department of the State of New York was taking up much of the sub-marginal land

in the vicinity of Connecticut Hill as a game refuge. It was thought that topographic maps of that vicinity might be of some value. A camp site on the shores of Cayuta Lake was leased in 1928 and surveys started. Some people confused between the names Cayuga and Cayuta, but the CE's never had any trouble. The area mapped to date in the vicinity of Cayuta Lake covers several hundred square hundred miles including the villages of Mecklenburg, Odessa, and Alpine. In 1932 a semi-permanent building was erected for kitchen, eating, and computing facilities. In 1934 a semi-permanent office and instrument building was erected. In 1948 an electric power line was run through the area so that the CE's, who are notoriously poor in electrical engineering, no longer had to keep the generating plants in operation. In fact, with the advent of dependable power, the students nowdays don't even know how to keep a gas lamp burning.

Electric power has also meant

mechanical refrigeration. The food is always kept in perfect condition. The CE's do not admit to having any influence in Washington, but nevertheless, they do have a deep freeze. The story is told of a camp about 1910 when everyone had some tainted food. Before the night was over, the sanitary facilities were badly over-crowded and many days thereafter one had to be very careful not to stray from the paths.

Of course, there are disadvantages to modern conveniences too. Nearly every farmer has his electric fence. One student, not sure that a metallic tape really had metal woven into it, got professor Spry to hold one end of the tape, and then innocently maneuvered so as to be able to drop the tape over an electric fence. For a few moments the air was blue on that party plot.

Appeal for Historic Data

In case any reader is still wondering how this happens to be the 75th camp, it should be mentioned that during the years 1943, 1944, 1945, and 1946, while the Navy V-12 program was being conducted on a three-terms-a-year basis, it was impossible to have summer camp and a substitute course was developed on the campus. In 1947, camp was held with headquarters in the Glen Springs Hotel in Watkins Glen, and the village and vicinity was mapped. Since 1948, Camp Cornell has again been established on the leased site at Cayuta Lake. In 1912, 1947, 1948, and 1949, two camps were held during the summer.

On this, our seventy-fifth year of camp, a celebration of the important part of the Civil Engineering curriculum is to be held. Cornell alumni have played an important part in the history of engineering, the centennial of which in this country is also being celebrated this year. An urgent appeal is hereby made to alumni to send in any bit of information they may have, particularly with regard to the earlier camps. For instance, the exact location of the various camp sites is in many cases unknown. Details of the instruments, procedures, instructional methods, is rapidly becoming lost in antiquity. Pictures of the camps, of

(Continued on page 42)

partners in creating

For many years K+E has pioneered in the manufacture and development of finest quality surveying instruments. K+E surveying instruments are renowned all over the world for their superb performance under conditions of all kinds, for their magnificent workmanship and for special features that come of progressive ingenuity.

KEUFFEL & ESSER CO.

EST. 1867

NEW YORK • HOBOKEN, N. J.

Chicago • St. Louis • Detroit • San Francisco • Los Angeles • Montreal

40

THE CORNELL ENGINEER

THE DU PONT DIGEST

Engineering Unlimited

Training in many different engineering branches
opens the door to opportunity at Du Pont

In recent issues of the *Digest*, we have discussed opportunities for mechanical and chemical engineers at Du Pont. However, this is only part of the picture. The special skills of more than a dozen different branches of engineering are needed on our scientific teams. For example:

Architectural, civil and structural engineers are attached to the central Engineering Department which handles most of the Company's construction projects. In this work they make site investigations, lay out new plants, design buildings, determine construction methods and specify materials and equipment. They also assemble necessary labor forces at field locations and supervise the building and assembly of complex manufacturing facilities.

Electrical engineers aid in designing process equipment and facilities for power generation and distribution, air conditioning and refrigeration. Instrumentation is another important phase of their work. Continuous

automatic analyzers for cyanides, ultra-violet gas analyzers, multivariable recorders, and new photo-multiplier circuits are just a few of their developments.

Industrial engineers help develop methods and standards for new or improved manufacturing processes. This work often serves as training for production supervisors.

Metallurgical engineers play an essential part in the central Engineering Department's program of research. Their studies are aimed at improving equipment and construction materials, as well as methods of measurement and control.

Safety engineers strive constantly to improve the broad safety program initiated by the Company's founder 150 years ago. Du Pont is understandably proud of its safety record, which in 1950 was eight times better than the chemical industry's as a whole, and fourteen times better than the average for all industry.



Carl Gossline, B.S., Iowa '41, conducts meteorological engineering studies to help solve plant chimney problems involving smoke and acids.

This by no means completes the list. Every U. S. industry utilizes Du Pont products. Hence there is also a need for specialists in mining, petroleum, textiles and many other branches of engineering.

Along with chemists, physicists and other technical personnel, almost every kind of engineer finds opportunity at Du Pont. Your engineering degree is only a door opener. Any man with ideas, imagination and the ability to handle people will find plenty of room for advancement in this company that has never stopped growing.

FOR HELP in choosing your career, send for free copy of "The Du Pont Company and the College Graduate." Describes futures for men and women with many types of training. Address: 2521 Nemours Bldg., Wilmington, Delaware.



150th Anniversary

BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

Entertaining, Informative — Listen to "Cavalcade of America," Tuesday Nights, NBC Coast to Coast



Fred R. Struder, B. Met. E., Rensselaer P. I. '50, examines a pressure strain recorder with Allen R. Furbeck, E.E., Princeton '39.



This DuPont plant, near Orange, Texas, manufactures nylon intermediates, plastics and heavy chemicals. Engineers attached to The DuPont Company's central Engineering Department designed the plant and supervised the installation of the manufacturing equipment.

Prominent Engineers

(Continued from page 20)

schools, finding time also to obtain his masters degree in Nursing. He has recently invented and patented a slide rule with which one can tell instantly the answer to any mathematical problem, the correct date of any event in history, the antidote for every poison, the odds at his favorite race track, and the current feature at any one of the four Ithaca movies. Although only 600,000,000 of these have been sold since they were put on the market last week, Hy has hopes that, with improvements, his gadget will someday become popular.

You would think that a man of Hy's interests would have little time to devote to extra-curricular activities—but not Hy! An All American in eight collegiate sports, Hy has proved conclusively that the engineer is not necessarily the hermit-like individual that the Ivy Room crowd deems him to be. Note: We are sorry but space limit-



Hy's sister (on right)

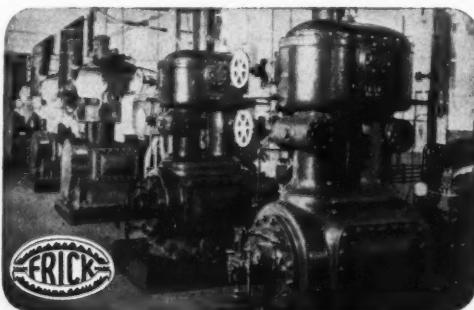
ations prevent us from publishing a complete list of Hy's activities, however, we shall be glad to send them to you upon request. Please be sure to enclose \$16.73 for postal charges and the box top off a package of Uranium 235 atoms.

Camp Cornell

(Continued from page 40)

students, and of working parties are greatly desired. If any alumnus has pictures of the camps, of students, and of working parties, they are greatly desired. If any alumnus has pictures he is willing to part with, they would be most welcome as an addition to the CE School Museum files, especially if they contain dates, names, and other identifying data. Any of this historic data or a write-up of anecdotes of camp life should be sent to Professor Arthur J. McNair, Head of Surveying Department and Director of Summer Survey, Cornell University, Ithaca, N.Y.

Any alumnus of the CE Summer Survey Camp who can attend the Diamond Jubilee on September 5, 1952, at Camp Cornell on the shores of Cayuta Lake is welcome. Reservations should be sent by August 25 to Camp Cornell, RD #1, Alpine, N.Y.



Snow Crop Marketers Install Frick Refrigeration

Snow Crop Marketers, a Division of Clinton Foods, Inc., and one of the largest packers of quick-frozen foods in the country, has in operation at Lewiston, Idaho, a battery of five large Frick compressors which produce temperatures as low as minus 40 degrees F. Installation by Lewis Refrigeration and Supply Co., Frick Sales Representatives at Seattle.

Super-dependability and economy have made Frick refrigerating machines the favorite with quick-freezers, as well as in air conditioning, ice making, and other cooling systems.

The Frick Graduate Training Course in Refrigeration and Air Conditioning, operated over 30 years offers a career in a growing industry.



PARTY TIME AGAIN And That Means STEINS FROM THE CO-OP

Pottery Steins, decorated with the Cornell shield, generous 12 ounce size.

\$1.95

Oversize Pottery Steins with the Cornell Seal and "Cornell University" on the lip. Choice of plain or nymph handles. Big 20 ounce capacity.

\$3.75

This same Stein can be ordered with your name, class numerals and fraternity or sorority crest. Prompt delivery.

\$4.25

Beer Barrel Copper Stein with Cornell Seal.

\$3.75

Party mugs in black or ivory with the Cornell Seal in Gold.

\$1.25

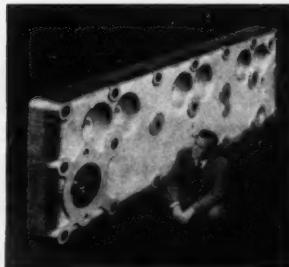
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THE CORNELL CO-OP

Barnes Hall

On The Campus

**Here's where
CARBORUNDUM
is going with
"man-made minerals"**



**CASTINGS
ARE IMPROVED**

in machinability when FERROCARRBO, a deoxidizer used in metallurgical processes, is added to the molten metal. This product by CARBORUNDUM is effective in producing the clean castings essential to today's unusual requirements.

*Made by the
Bonded Products and Grain
Division*



ROCKET EXHAUST LINERS are among the developments by CARBORUNDUM that take over where ordinary materials are inadequate to the task. Produced from "man-made minerals," this super refractory product is highly resistant to the extremes of abra-

sion and high temperature produced at the rocket nozzle. Super Refractories have been developed by CARBORUNDUM to increase output and reduce operating costs where high temperatures, resistance to abrasion, corrosion or erosion are important factors.

Made by the Refractories Division



Searing flame and erosive gases make life incredibly short for uncooled rocket blast tubes.

Problem without precedent: how to protect the tubes without using costly alloys. Experiment, testing and imaginative thinking resulted in a solution by CARBORUNDUM—molded super refractory liners. Molded, then baked, they

◀ **POWDER METALLURGY** is a field of interesting new developments. These gears are produced by sintering powdered metal in furnaces equipped with GLOBAR silicon carbide electric heating elements. Having extremely high electrical resistance and no known melting point, the heating elements make it possible to attain high heats under accurate control.

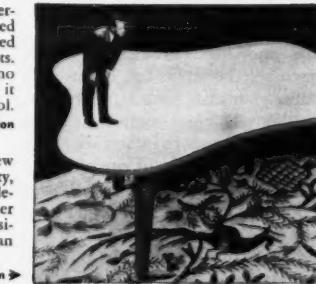
Made by the GLOBAR Division

FURNITURE MAKERS are now using the new extra-hard finishes for increased beauty and durability, aided by RED-I-CUT Waterproof Abrasive Paper developed by CARBORUNDUM. This tough new paper cuts faster, gives a better finish and, as an enthusiastic shop owner expressed it, "more mileage than anything we have ever used."

Produced by the Coated Abrasives Division ▶

must emerge from the oven with tolerances of which a machinist might be proud.

Problems without precedent are the kind we like. In fact our business was born with the invention of a material without precedent, the first "man-made mineral." This was silicon carbide, a product of the electric furnace, which



has since become familiar the world over in products by CARBORUNDUM.

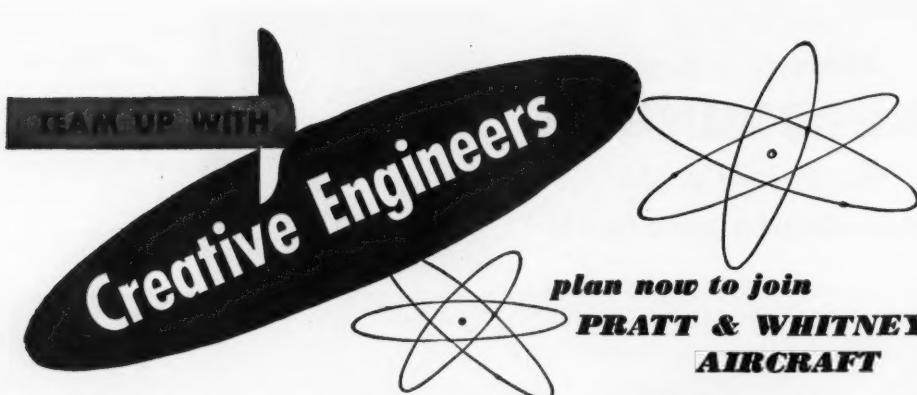
Your own concern with "problems without precedent" is the reason why we bring you this message here. Whether you are a potential customer of CARBORUNDUM or a potential member of our great engineering staff, we welcome your interest—and your inquiries.

**Look to CARBORUNDUM for the real news about
"man-made minerals"**

TRADE MARK

THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.

Products by CARBORUNDUM include Grinding and Cutting-Off Wheels, Discs and Sticks... Coated Abrasive Sheets and Belts... Waterproof Abrasive Paper... Abrasive Grain and Powders and other abrasive products... Electric Heating Elements and Ceramic Resistors... Grain and Briquettes for deoxidizing steel and iron... Super Refractory Bricks, Special Shapes and Cements... Porous Filter Media and Diffusers—and are marketed under the following trademarks: CARBORUNDUM • ALOXITE • MX • RED-I-CUT • GLOBAR • FERROCARRBO • CARBOFRAX • ALFRAX • MONOFRAX • MULLFRAX



FOR over a quarter of a century the Pratt & Whitney Aircraft Division of United Aircraft Corporation has depended upon *creative engineering* to bring its products to the forefront.

How well this idea has worked is amply demonstrated by the outstanding leadership record which Pratt & Whitney has established in both piston and turbine aircraft engine types.

And for the future, because of its sound engineering background and research facilities, Pratt & Whitney is one of the few companies in the country to be selected to develop an atomic powered engine for aircraft.

Creative engineering will continue to be given top emphasis at Pratt & Whitney—and it might well be the best answer to *your* future too—if you want a chance to put *your own* ideas to work.

Why not find out where you could fit into this great engineering organization? Consult your Placement Counselor or write to Frank W. Powers, Engineering Department at

PRATT & WHITNEY AIRCRAFT
DIVISION OF UNITED AIRCRAFT CORPORATION
EAST HARTFORD, CONNECTICUT

Lab Reports

(Continued from page 14)

size, and personal history of the machine, the data, the instructor's name, your own, your lab partners', all the telephone numbers of the group so that more information will be at the fingertip of anyone who has a telephone, and all other items which may be of some help, no matter how obscure or obtuse. Also plot the ordinates in units of 3.7 and the abscissas in units of 3.3 per division ruled on the graph paper. It will take a little time, but the results in exasperation of the instructor will be worth it. Extreme cases have led to that most dreaded of all occupational diseases to which the faculty are prone—"Graphical Twinge"—for which there is no remedy.

The Discussion should also include a full and adequate treatment of all the results, if any, and as many dangling particles, missing and confusing antecedents, and clumsy constructions as the instructor may occasionally provide as an

example in his own work.

The Conclusions are your own business. If you think you proved something, say so, and also say why it is probable that you are wrong. This section is usually omitted.

College News

(Continued from page 27)

was a success, since five snow plows have been seen at work ever since trying to keep the Stewart Avenue Bridge over Fall Creek open to traffic. Route 34 is still impassable and is expected to remain so for the next few weeks.

Glencannon To Teach

McTavish R. Glencannon has been appointed Professor of Chemical Engineering. He is a native of Edinburgh, Scotland, and will be the teacher of several unit operations. He is well known for his work on the phase diagram Ethanol-Water, and is now recovering from a severe gastric disturbance acquired during similar experiments on the system Methanol-Water.

Earthquake in White Hall

The top floors of White Hall and parts of Franklin were rocked by a series of explosions and violent earthquakes just before Saint Patrick's Day. The University Safety Division reported that little damage was done. The Mathematics Department, directly below, complained of streams of liquid seeping through the ceiling, and the Safety Division dispatched three men to lap up the damage.

President Killed

Ten drunken students in a stolen fire engine sped at sixty miles per hour down the left side of Tower Road last week and killed the President. The Campus Patrol freed the students, saying that it has jurisdiction only over parking violations and similar high crimes.

Schoellkopf Expansion

Plans have been drawn up by four student architects to double the seating capacity of Schoellkopf

(Continued on page 48)

The Torrington Needle Bearing needs little space—saves time in assembly



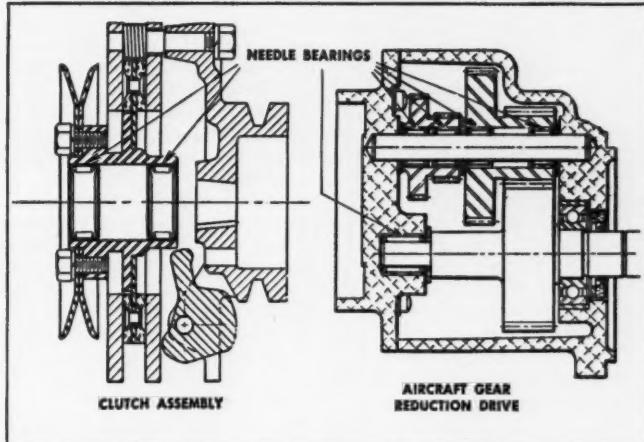
The Torrington Needle Bearing is a completely self-contained unit consisting of a full complement of small diameter rollers and a single retaining shell. This unit design and construction greatly simplify handling and speed assembly, and help reduce the size and weight of related parts.

High Load Capacity in Small Space

Because the many rollers distribute loads over a large contact surface, a Needle Bearing has a very high load capacity in relation to its size. In fact, the Torrington Needle Bearing has a higher rated radial load capacity than any other type of anti-friction bearing of comparable outside diameter. This not only permits the use of a smaller, lighter bearing for a given load, but also allows reductions in the size and weight of housings and other related components. The Needle Bearing's large inside diameter permits larger shafts to be used in cramped quarters, an important factor in many designs.

Installation Simplified

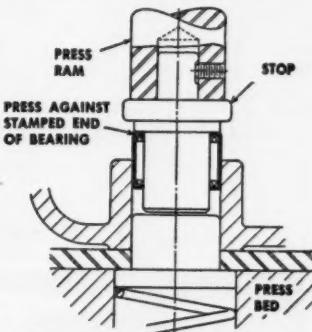
The installation of Torrington Needle Bearings is fast and easy. The housing bore is simply machined to proper diameter. The



Typical installations of Torrington Needle Bearings are characterized by simplicity of design. Needle Bearings are made for shafts as small as 5/32" up to those as large as 7 1/4".

bearing is then pressed into this housing. An arbor press is normally used for this operation. No spacers or retainers are needed to keep the bearing in place. An accurately made shaft is required, of course, as it serves as the inner race in most cases and must be hardened and ground to correct size. For applications where an unhardened shaft is desired or necessary, inner races can be furnished for all Needle Bearings.

These advantages make Torrington Needle Bearings ideal for applications where space or weight is at a premium, or where mass production methods necessitate the use of a bearing that is as easy as possible to handle and install.



The use of proper tools for installing Needle Bearings speeds up assembly. The arbor press tools above are ideal.

Other features of Torrington Needle Bearings will be covered in other advertisements in this series. For additional information regarding Needle Bearings, please contact our engineering department.

THE TORRINGTON COMPANY

Torrington, Conn. • South Bend 21, Ind.

District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON NEEDLE BEARINGS

NEEDLE • SPHERICAL ROLLER • TAPERED ROLLER • STRAIGHT ROLLER • BALL • NEEDLE ROLLERS

Out of Phase

(Continued from page 26)

After I have been lying in the corner for about three or four hours, the secretary calls out to Director Fockschmeister's room,

"There's another student out here what's been stepped on by your pet elephant, what shall I do?"

From deep in the luxurious red-carpeted cavern comes a booming resonant voice, full of sympathy and regret,

"Get the doctor immediately, and have him pick the bones from between the elephant's toes."

But the secretary is on my side.

"But Director, the man is out here now." She pauses to glance at the stump which used to be my left leg. "I think his trousers have been damaged slightly."

Again from the cavern with the gold plated walls comes the deep booming voice,

"Well, in that case—I can tell by the tone of his voice that he is softening—"Tell him to send me a bill for the repairs to the trousers.

And when it arrives, throw it out."

"At this moment the door swings open and the stalwart figure of P. G. Manselfarb rushed in. He is angry. It shows. Two feet of straight white hair point at the ceiling from the top of his head and his normally placid face is the color of an African Violet (in full bloom). Shouting, he barges into the Director's office,

"Who appropriated Room 4-Q to be used as an office for the Society for Professional Oversupplying of Engineers?"

The Director is altogether unmoved and replies with the great dignity that is the sign of the true malengineer the world over,

"I did, my good man, it is one of my *important* activities, as opposed to the humdrum task of running the College of Malengineering. And may I ask who you are?"

"Why, you appointed me head of the Watch-winding Department only two years ago. Don't you remember?"

"But old soft-soap held his

ground and replied to this,

"My dear fellow, if I were to take time out to get to know the members of my staff, I wouldn't have time to calculate the increases in tuition. . . . tuition! Does that squashed student out there pay tuition or does he have a scholarship?"

"Tuition," I reply, as the secretary is sleeping on the desk. "I am paying my own tuition out of what little I make from the sale of heroin in the Ithaca Nursery School."

"Yikes," screams the Director, "We can't afford the loss in revenue if he bleeds to death. Call the Police. Call the Boy Scouts. Call the Clinic. No, we want to save this one, call a real doctor."

... At this point in his story, the reclining Sitzfleisch gazed lovingly at his cast iron left leg, and then spoke in a hushed voice.

"Rodney, do you realize what would have happened to me if I hadn't been paying my own tuition?" Alas, life is but a bowl of rancid jelly."

1952 PUMP ENGINEERING HANDBOOK

The Research Has Been Done For You

"PUMP ENGINEERING DATA"

has been compiled for professional and student engineers who want their information in one volume. Designed for ease of use, with tables, diagrams, and charts.

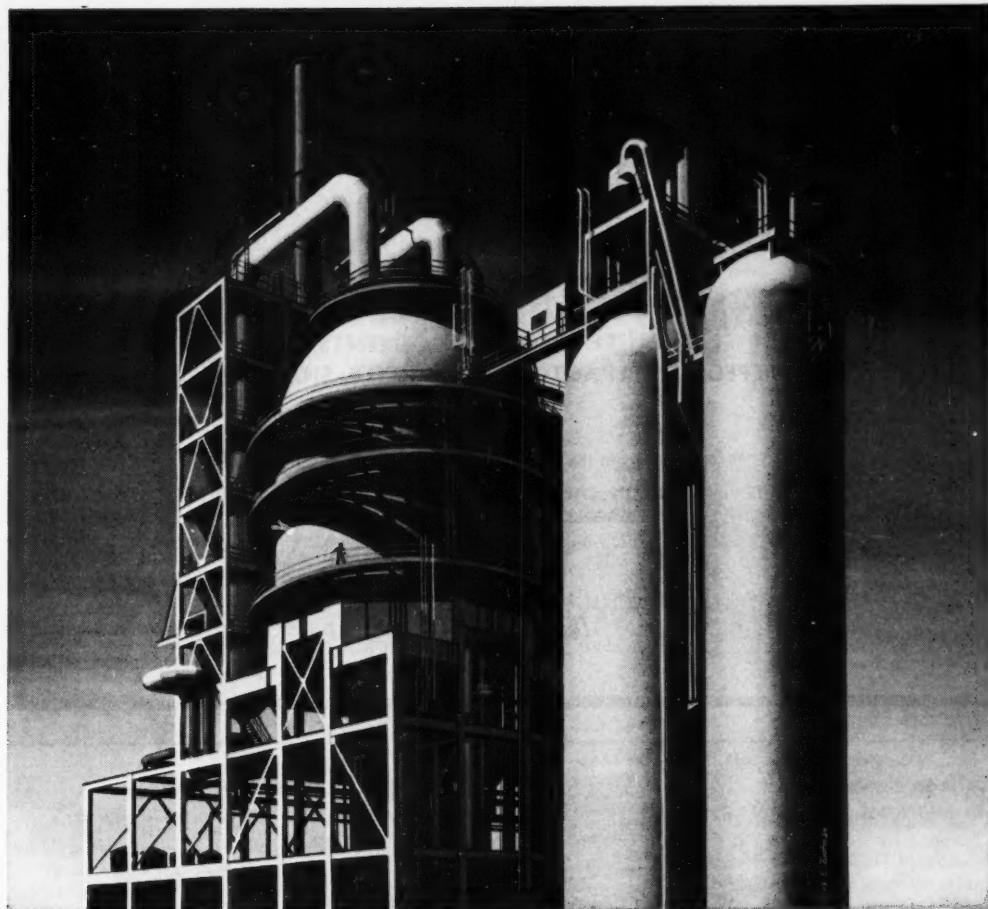
... was assembled by experts to provide the most pertinent and up-to-date material for pump engineering. Substantially bound in maroon and gold—contains over 400 pages.

... covers pumping problems encountered in buildings, waterworks, sewage treatment plants, oil refineries, mines and quarries, irrigation, power plants, food and chemical plants, paper mills, and in many other applications.

Send today for your copy of
"PUMP ENGINEERING DATA" \$3.00

WHEELER-ECONOMY PUMPS

ECONOMY PUMPS, INC. • Division of C. H. Wheeler Mfg. Co.
Sedgley at 19th and Lehigh • Philadelphia 32, Penna.



What's behind this giant "Cat Cracker"?

This catalytic cracking plant is in operation at Linden, N. J., refining oil products for Esso Standard Oil Company.

This behemoth can produce 1,520,000 gallons of liquid power *every day* . . . that means more heat for homes, more fuel to operate factories and farms, more power to make the nation's wheels go 'round . . . better living for everybody.

It took a vast amount of scientific

skill and achievement, of vision and daring, to build this huge processing plant and put it into operation. Scientific petroleum research and oil engi-

neering progress have always been pioneered and encouraged at Esso.

With the chance to learn and advance on the job, along with fair pay and good working experience . . . the employees of Esso Standard Oil form a loyal and experienced team, that is constantly striving to improve the high quality and value of products that are sold at the famous Esso Sign from Maine to Louisiana.



E S S O S T A N D A R D O I L C O M P A N Y

Vol. 17, No. 8

47



Manufacturers of Super-Refractories Only

REFRACTORY CRUCIBLES
GRAPHITE CRUCIBLES
HIGH-TEMPERATURE CEMENTS
SPECIAL REFRACTORY BRICK, TILE, SHAPES

From the Following Materials:—

GRAPHITE SILICON CARBIDE — FUSED ALUMINA — MULLITE
MAGNESIA ZIRCON

LAVA CRUCIBLE-REFRACTORIES CO.
PITTSBURGH, PA.

College News

(Continued from page 44)

Crescent by converting it to Schoellkopf Half-moon.

Measurements will be made at Fuertes Observatory. The West Stands will become a Minor Satellite.

Oakley Sparks Triumph

The Delta Club, EE honorary, held its annual kite-flying during a recent severe thunderstorm. The object, as usual, was to find the man who got the biggest charge out of kite-flying and to award him the traditional keg of beer.

All of the contestants collected their finds in standard five-farad condensers; the condensers were then discharged through standard ballistic galvanometers. Several students won honorable mentions for their charges. Stanley R. Oakley, EE '52, blew the galvanometer apart and killed one of the judges.

The Delta Club held a meeting immediately afterwards in Franklin 115, during which it awarded him



—R.C.A.
Stanley R. Oakley (right, without hat) is helped by friends in hauling in his kite.

a keg of beer and elected him President of the Club.

Engineers' Lounge

(Continued from page 22)

being played in symphonic style by a professional gent in a tuxedo.

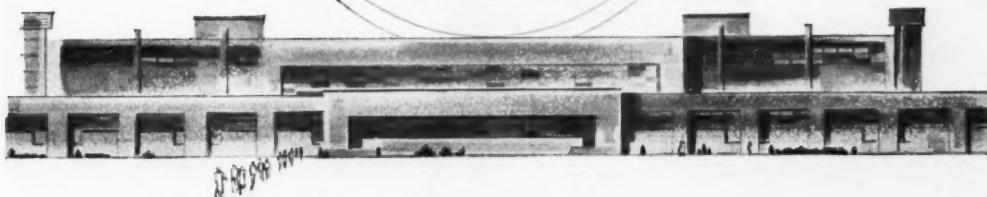
Glass-covered mahogany tables replaced the old grooved boards. A sign warning "Please do not use compasses." The family had their own corner closed off with a brass knocker adorning the front door; the youngster was gliding around cautiously in a miniature Cadillac convertible. A few of the fellows were listening to a ball game from Japan; others were watching a breakfast show on TV. A white-coated waiter was passing out coffee to those who wished it. In general, everybody and everything looked in the pink of condition.

Our friend was dazed. He forgot about the grudge against his pals. Thinking he must have been dreaming, he turned around and walked out in amazement.

The moral of this story is: If someone asks you to contribute to the fund for improving the lounge —DO IT.

THE CORNELL ENGINEER

NEW research expansion AT DOW



Research is the cornerstone of rapid growth in the chemical industry. The continuance of this growth at Dow is assured by expanded research facilities requiring the talents of many scientific people in widely varying fields of endeavor.

At the home plant in Midland, Michigan, Dow is building another completely new laboratory to augment the current work in organic chemistry. Increased facilities for Dow's progressive work in spectrographic analysis is planned to keep pace with important advances in this field.

In Dow's Freeport, Texas Division, even greater research expansion is taking place. Here a huge research center consisting of eight buildings is under construction. This center, which will include a modern technical library, will have a total floor space of 57,000 square feet.

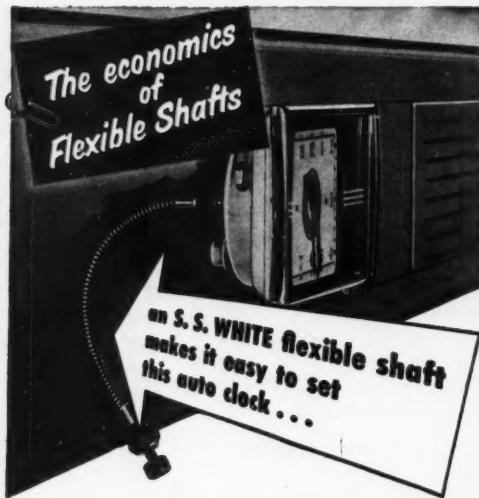
Dow's booklet, "Opportunities with The Dow Chemical Company," especially written for those about to enter the chemical profession, is available free, upon request. Write to The Dow Chemical Company, Technical Employment, Midland, Michigan.



THE DOW CHEMICAL COMPANY

Midland, Michigan





When this automobile clock was designed, its manufacturer had in mind the probability of varied instrument panel locations with the resultant need of an adaptable coupling to the control knob. He chose an S.S.White flexible shaft to do the job. As the illustration shows, this simple hook-up permits both the clock and the control knob to be located in its most advantageous position.

* * * *

Many of the problems you'll face in industry will involve the application of power drives and remote control with the emphasis on low cost. That's why it will pay you to become familiar with S.S.White flexible shafts, because these "Metal Muscles"® represent the low-cost way to transmit power and remote control.

**SEND FOR THIS FREE
FLEXIBLE SHAFT BOOKLET . . .**

Bulletin 5008 contains basic flexible shaft data and facts and shows how to select and apply flexible shafts. Write for a copy.



**THE S. S. WHITE INDUSTRIAL DIVISION
DENTAL MFG. CO.**

Dept. C. 10 East 40th St.
NEW YORK 16, N. Y.

QUICK QUIZ
ON INSULATED CABLES

Q. What kind of cable testing comes closest to duplicating actual service conditions?

A. Proving ground tests. Since 1936, Okonite engineers have been studying cables in an outdoor proving ground. Cables are buried in various soils, pulled in conduit, strung overhead, subjected to temperature, voltage and loading conditions that duplicate actual operation. Facts gained here are recorded, evaluated, and added to Okonite's 72 years of experience in making the highest quality insulated cables.

THE OKONITE COMPANY, PASSAIC, NEW JERSEY

THE BEST CABLE IS YOUR BEST POLICY

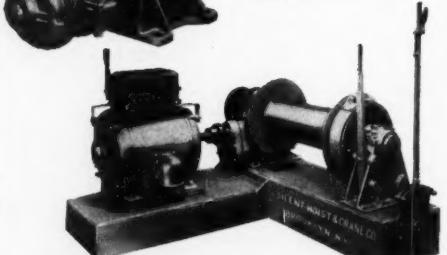


8038

CAR PULLERS, BARGE MOVERS
ELECTRIC, GASOLINE, DIESEL

Let **Silent Hoist** Car Pullers, electric, gasoline, and diesel driven Winches serve you. Power-driven Capstans, Gypsies, and single and double Winches for all materials-handling applications — rigging, skip hoists, maintenance, construction, cable ways, etc.

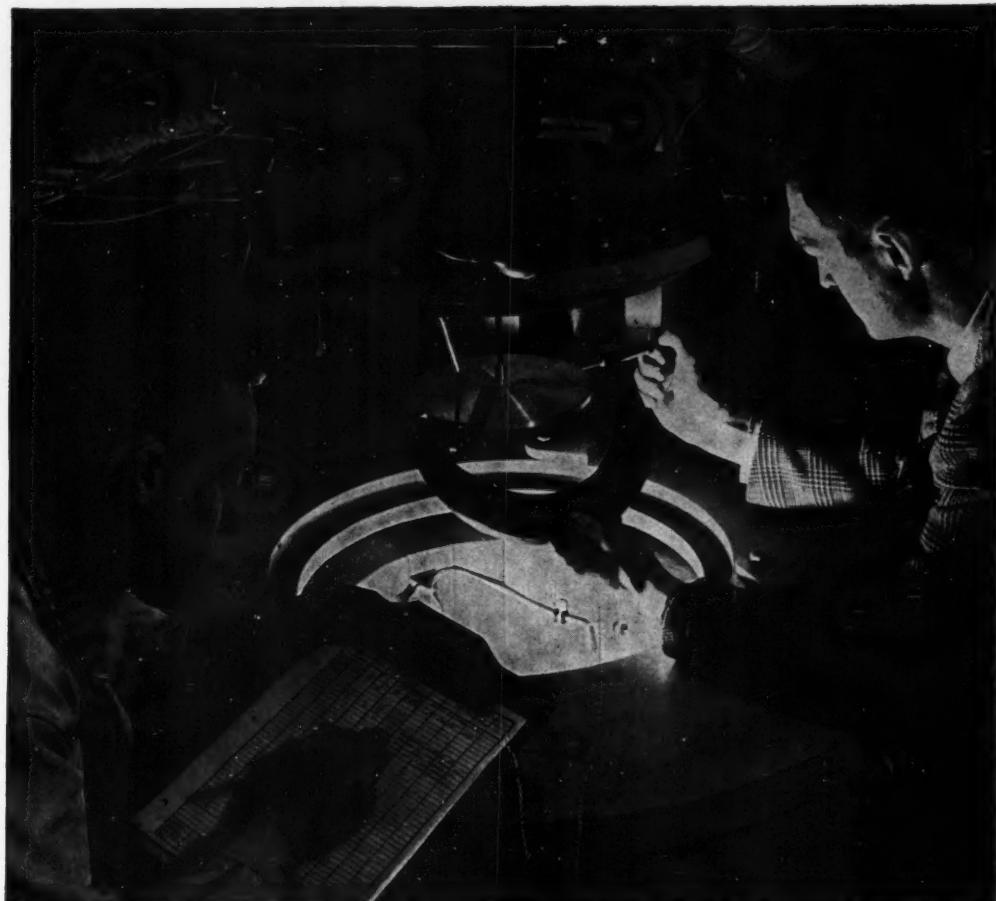
CAPSTAN	DRUM WINCH
6 Sizes:	4 Sizes:
Draw Bar Pull Capacities	
2,000 lbs.	6,000 lbs.
6,000 lbs.	12,000 lbs.
12,000 lbs.	24,000 lbs.
18,000 lbs.	40,000 lbs.
22,000 lbs.	
30,000 lbs.	



Mfrs. of **KRANE KAR** Swing-Boom Mobile Cranes, **LIFT-O-KRANE** Fork Lift Trucks, Cranes for Motor Trucks, Capstans, Gypsies, Single and Double Drum Winches, Coal Slicer Hoists.

SILENT HOIST & CRANE CO.

THE CORNELL ENGINEER



Do you want a career with a future?

More and more of America's outstanding engineers are carving fine careers for themselves at Boeing. They've found a future here in an Engineering Division that's been growing steadily for over 35 years.

If you measure up, there's great opportunity here for you, too, and the rewarding experience of working on some of the nation's most vital programs such as the B-52 and B-47 jet bombers, guided missiles and other revolutionary developments.

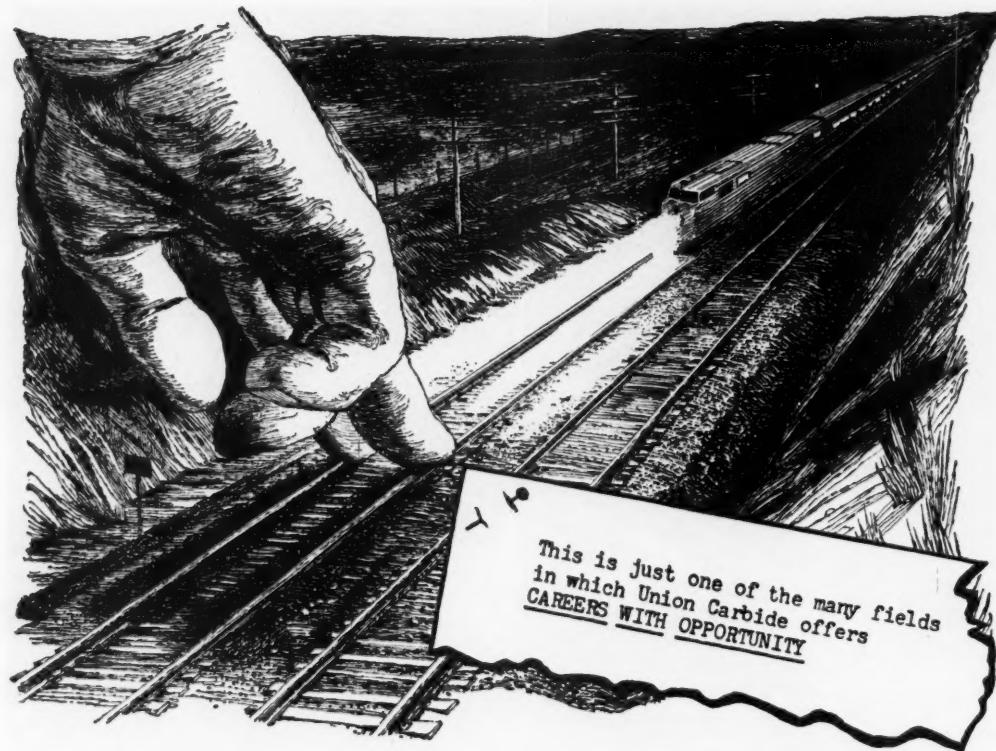
You'll associate with men of highest renown, men who can help further your own standing. You'll find here research facilities that are among the world's finest. And you'll enjoy a good salary that grows with you.

More housing is available in Seattle than in most other major industrial centers. Or, if you prefer the Midwest, similar openings are available at the Boeing Wichita, Kansas, Plant. Inquiries indicating such a preference will be referred to the Wichita Division.

Decide *now* to build your career at Boeing after graduation. Boeing has continuing needs for experienced and junior aeronautical, mechanical, electrical, electronics, civil, acoustical, weights and tooling engineers for design and research; for servo-mechanism designers and analysts; and for physicists and mathematicians with advanced degrees.

For further information,
consult your Placement Office or write:
JOHN C. SANDERS, Staff Engineer—Personnel
Boeing Airplane Company, Seattle 14, Washington

BOEING



This is just one of the many fields
in which Union Carbide offers
CAREERS WITH OPPORTUNITY

Clearing the track of clickety-clack

You can ride in comfort on longer-lasting rails because the song of the track is being stilled

Like the paddleboat whistle on the river, the clickety-clack of wheels on rails is on its way to becoming a memory.

This familiar clatter and chatter has been like music to some of us when we travel. But it's been a headache to others . . . particularly our railroads.

Wheels pounding on rail joints cause jolting and wear as well as noise. And wear means expensive repair or replacement of rails and the bars that connect them.

ELIMINATING RAIL JOINTS—"Ribbonrail" is becoming important news because it provides a way to solve the high cost of joint maintenance by eliminating the joints themselves.

RAILS BY THE MILE—"Ribbonrail" is formed by welding the rails together under pressure in the controlled heat of oxy-acetylene flames. The welding is done on the job before the rails are laid . . . and they become continuous ribbons of steel up to a mile or more in length.

Mile-long lengths of rail in use may seem impossible be-

cause of expansion and contraction under extreme changes in weather and temperature. "Ribbonrail" engineering has solved this problem . . . reduced rail maintenance cost, and created the comfort of a smoother, quieter ride.

A UCC DEVELOPMENT—"Ribbonrail" is a development of the people of Union Carbide. It is another in the long list of achievements they have made during 40 years of service to the railroads of America.

STUDENTS and STUDENT ADVISERS

Learn more about the many fields in which Union Carbide offers career opportunities. Write for the free illustrated booklet "Products and Processes" which describes the various activities of UCC in the fields of ALLOYS, CARBONS, CHEMICALS, GASES, and PLASTICS. Ask for booklet B-8.



**UNION CARBIDE
AND CARBON CORPORATION**

20 EAST 43RD STREET UCC NEW YORK 17, N. Y.

— UCC's Trade-marked Products of Alloys, Carbons, Chemicals, Gases, and Plastics include —

PREST-O-LITE Acetylene • LINDE Oxygen • PRESTONE and TREK Anti-Freezes • BAKELITE, KRENE, and VINYLITE Plastics • SYNTHETIC ORGANIC CHEMICALS
NATIONAL Carbons • ACHESON Electrodes • PYROFAX Gas • HAYNES STELLITE Alloys • ELECTROMET Alloys and Metals • EVEREADY Flashlights and Batteries

What Are They?

- Thrust bearings*
- Clutch disks*
- Grinding wheels*
- Ceramic insulators*

The correct answer is grinding wheels, shown as they emerge from the electric kiln.

Not ordinary grinding wheels, however. They are Norton *New-Process* Wheels — made by modern, streamlined, precision methods developed by Norton engineers.

A Big Step Forward

This new process involves advanced equipment, new manufacturing techniques, and close quality control during every step of grinding wheel production. As a result, Norton *New-Process* Wheels are produced to a degree of structural uniformity never before possible.

This increased uniformity means extra assurance of consistent grinding action throughout each wheel and from wheel to wheel. Which, in turn, means more evenly wearing, longer lasting wheels — together with more cutting action per wheel and per dollar.

In addition, the built-in balance of Norton *New-Process* Wheels cuts down vibration and enables them to hug the work more closely, assuring smoother, better grinding performance.

A wide range of wheels employing both ALUNDUM® (aluminum oxide) and CRYSTOLON® (silicon carbide) abrasives are made by the new process.

Looking Ahead With Norton

Geared to industry's constantly expanding needs, Norton Company serves *every* manufacturing field by



"making better products to make other products better." Young men planning technical careers are invited to consider the established leadership and far-ranging scope of the Norton world-wide organization.



and performance. Write for your free copy.

Send For Additional New-Process Facts

Recent Norton literature gives further details on this important advancement in grinding wheel manufacture



John J. Amero, M. S., Cer. Eng., North Carolina State '38, checks duplication of grinding wheel grade with the aid of an oscillograph. John has been working on the development of Norton "New Process" wheels.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

NORTON

TRADE MARK REG. U. S. PAT. OFF.

Making better products to make other products better



NORTON COMPANY, WORCESTER 6, MASSACHUSETTS

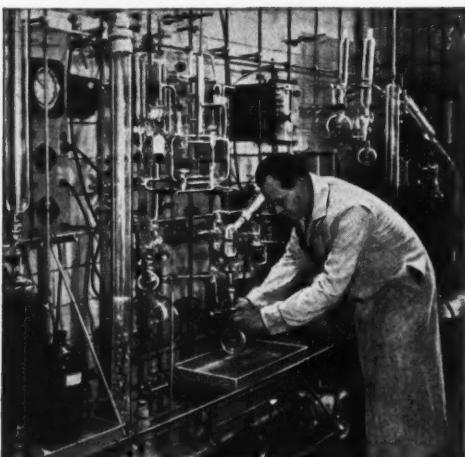
BEHR-MANNING, TROY, N. Y. IS A DIVISION OF NORTON COMPANY

These Great Laboratory

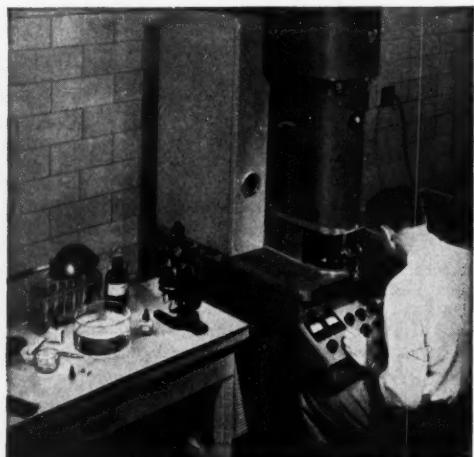


PETROCHEMICALS offer independent inventors great opportunity for exploration and reward. Such synthetics as Nylon, Viny-

lite, Neolite are already indispensable to our expanding economy—and new ideas in this area are at a premium today.



UNDER THE SINCLAIR PLAN, chemistry laboratories like these are open for the first time to independent inventors.



ELECTRON MICROSCOPE, capable of magnifying 100,000 times, is typical of the expensive equipment now available.

Facilities Are Open to You

Many inventive people have responded to the Sinclair Plan's offer of laboratory facilities—to others who wish to do so, a suggestion: There is promise and profit in oil-based synthetics.

Eight months ago, Sinclair turned over a part of its great laboratories at Harvey, Illinois, to independent inventors who had promising ideas in the field of petroleum products but who did not have the facilities needed to develop or prove out their ideas.

To date nearly 5,000 people have submitted ideas to the laboratories, and the Plan is recognized as a valuable service to independent inventors. As a result we have made the Sinclair Plan part and parcel of the long-range operation of our company.

There may be inventive people interested in this Plan but wondering what sort of ideas or what areas would be profitable to explore. To those people we suggest the field of petrochemicals. Such things as plastics, synthetics, substitutes and new materials as yet undeveloped—made from petroleum—offer great opportunities for invention and reward.

If you have an idea of this sort—or in the general area of petroleum products or applications—you are invited to

submit it to the Sinclair Research Laboratories. In your own interest, each idea must first be protected by a patent application or a patent.

The inventor's idea remains his own property

If the laboratories select your idea, they will make a very simple arrangement with you: In return for the laboratories' work, Sinclair will receive the privilege of using the idea for its own companies, free from royalties.

This agreement in no way hinders the inventor from selling his idea to any of the hundreds of other oil companies for whatever he can get. Sinclair has no control over the inventor's sale of his idea to others, and has no participation in any of the inventor's profits.

HOW TO PARTICIPATE: Instructions are contained in an Inventor's Booklet available on request. Write to: W. M. Flowers, Executive Vice-President, Sinclair Research Laboratories, Inc., 600 Fifth Avenue, New York 20, N. Y.

IMPORTANT: Please do not send in any ideas until you have sent for and received the instructions.



SINCLAIR RESEARCH LABORATORIES—nine buildings containing the most modern testing equipment known—have contributed many of today's most important developments in petroleum.

Under the Sinclair Plan, the available capacity of these great laboratories is being turned over to work on the promising ideas of independent inventors everywhere.

SINCLAIR—for Progress

FINANCIAL REPORT

Statement of Ownership, Publication, and Financial Integrity for the Fiscal Year Ending February 29, 1952

This magazine is owned and operated by the CORNELL ENGINEER, Inc., a non-profit philanthropic organization, for the benefit of needy editors and board members. It is published whenever feasible and safe. Entered as second rate matter at the Post Office at Ithaca, N.Y., under Section 0000 of an act enacted sometime during the Dark Ages.

It will be the policy of the entering board to make a thorough and continuing investigation of the fiscal policies of our predecessors. (Never give up a good thing.) In order to reassure the students and faculty who have good reason to doubt the integrity of the CORNELL ENGINEER staff we offer the following very tentative report:

Income

Subscription (to editor's father)	\$ 1.50
Advertising	20.36
Subscriptions sold (Freshman Orientation Week)	739.50
Newsstand sales	2.61
Offerings collected by business manager while posing as deacon at church	780.02
Editor's hobby (printing \$5 bills)	8,975.36
Parking service	
Sale of campus parking stickers	780.00
Commission for fixing tickets	1,257.72
Advance sales of prelims	2,782.10
Handbook for Engineering Bank	
Robberies	127.90
Deposit refund on empty beer bottles	12,695.96
Sale of cartoons to Widow	357.32
Sale of old news to Sun	7.39
Paid on blackmailing operation	
From students	1,295.87
From faculty	17,920.03
From staff	12,536.01
From Ithaca College	3.25
Found next to water cooler01
 TOTAL INCOME	 \$58,285.21

Expenditures

Printing costs	\$ 6,250.80
Bribes for articles	11,987.63
Unpaid subscriptions	739.50
Other bad debts	1,272.72
Salaries	27,272.25
Key chain for editor	15.03
Engraving	812.64
ECMA convention trip	300.00
Telephone	
Business41
Social	814.23
Fire insurance	57.92
Gasoline	25.37
Rags	2.90
Matches	1.11
Straight-jacket for editor	39.50
25 two-way wrist radios for final exams	1,653.23
Cadillac for business manager	7,500.28
Cadillac upkeep and operation	19,703.93
Jaguar for illustrations editor	15,250.99
Lawsuit by Colorado Engineer for borrowing material	5,000.00
Lawsuit by Purdue Engineer for borrowing material	10,000.00
Circulation to friends and relatives	23,001.75
UNCLE MILTIE to win	8,962.03
Commissions on advertising and sales	7,666.66
Discounts on same05
Christmas presents for staff	175.42
Liquor	16,885.55
Chaser60
Slide rule for office boy	23.75
Haircuts for editor	10.00
Unaccounted for and miscellaneous	20,000.00
Miscellaneous and unaccounted for	5,000.00
 TOTAL EXPENDITURES	 \$174,869.66
DEFICIT	116,611.45
R.F.C. LOAN	116,611.45

What's Happening at CRUCIBLE

about special shape type steel



Crucible special purpose steel for type character application

The development of cold rolled special shape type steel is one of Crucible's important contributions to the business machine industry. A major part of the type characters used for the manufacture of typewriters are made from this special shape.

Here's the step-by-step process:

1. Cold rolled special shape produced by Crucible.



2. The type slug cut from the special shape material.



3. The wings of the type slug are bent down and taper formed toward the edges.



4. The type characters are cold swaged on the solid edge of the bent type slug.



5. The flash trimmed off after the swaging operation.



6. The finished type ready for hardening, plating and soldering to the type bar.



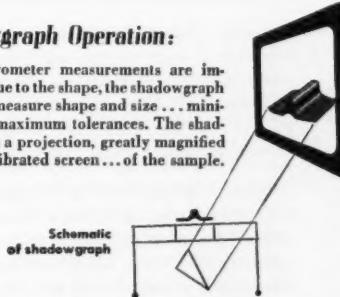
The production of Crucible steel for this job is the result of engineering and practical know-how combined with a special method of manufacture to assure a homogeneous microstructure for maximum forming properties, excellent surface characteristics for good die life, and close accuracy control for all dimensions of the shape.

The production of type steel requires the use of small precision rolling mills equipped with shaped rolls and operated by skilled workmen. During preliminary and final inspection, shadowgraph equipment is constantly used to check for size accuracy.

As a result of its outstanding quality, Crucible's special shape type steel is constantly in demand and used by leading typewriter manufacturers.

Shadowgraph Operation:

Since micrometer measurements are impractical due to the shape, the shadowgraph is used to measure shape and size... minimum and maximum tolerances. The shadowgraph is a projection, greatly magnified... on a calibrated screen... of the sample.



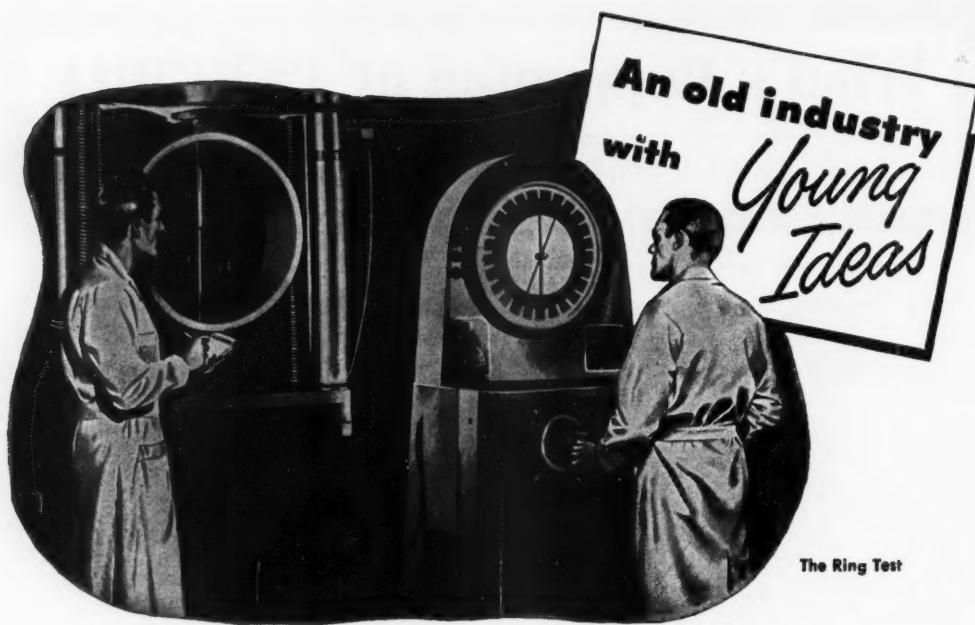
If you have a requirement for special steels—check with Crucible. Feel free to draw on the experience of our metallurgists and engineers. Crucible Steel Company of America, General Sales and Operating Offices, Oliver Building, Pittsburgh, Pa.

CRUCIBLE

first name in special purpose steels

52 years of *Fine* steelmaking

Midland Works, Midland, Pa. • Spaulding Works, Harrison, N.J. • Park Works, Pittsburgh, Pa. • Spring Works, Pittsburgh, Pa.
National Drawn Works, East Liverpool, Ohio • Sanderson-Halcomb Works, Syracuse, N.Y. • Trent*Tube Company, East Troy, Wisconsin



The Ring Test

The ring test, shown above, is a scientific method for determining the modulus of rupture of pipe. It is not a required acceptance test but one of the additional tests made by cast iron pipe manufacturers to ensure that the quality of the pipe meets or exceeds standard specifications.

A ring, cut from random pipe, is subjected to progressively increased crushing load until failure occurs. Standard 6-inch cast iron pipe, for example, withstands a crushing weight of more than 14,000 lbs. *per foot*. Such pipe meets severe service requirements with an ample margin of safety.

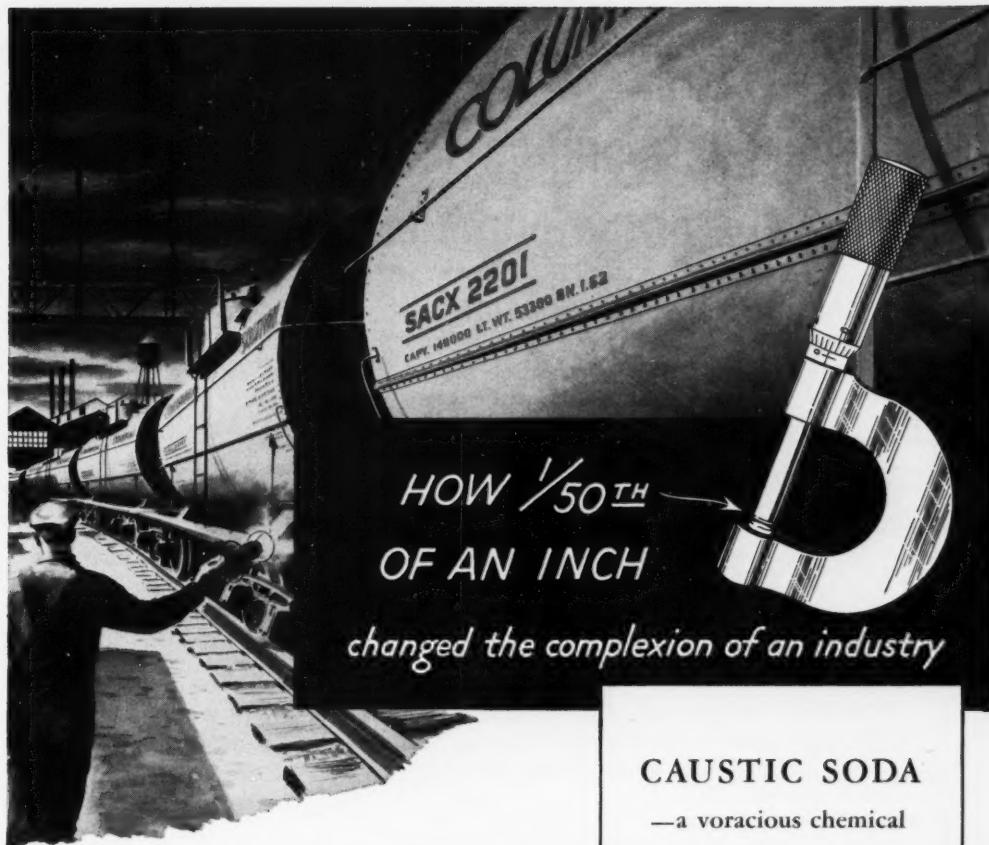
Scientific progress in the laboratories of our members has resulted in higher attainable standards of quality in the production processes. By metallurgical controls and tests of materials, cast iron pipe is produced today with precise knowledge of the physical characteristics of the iron before it is poured into the mold. Constant control of cupola operation is maintained by metal analysis. Rigid tests of the finished product, both acceptance tests and routine tests, complete the quality control cycle. But with all the remarkable improvements in cast iron pipe production, we do not forget the achievements of the early pipe

founders as evidenced by the photograph below of cast iron pipe installed in 1664 to supply the town and fountains of Versailles, France and still in service. Cast iron pipe is the standard material for water and gas mains and is widely used in sewage works construction. Send for booklet, "Facts About Cast Iron Pipe." Address Dept. C., Cast Iron Pipe Research Association, T. F. Wolfe, Engineer, 122 So. Michigan Ave., Chicago 3, Illinois.



Section of 285-year-old cast iron water main still serving the town and fountains of Versailles, France.

CAST IRON PIPE SERVES FOR CENTURIES



A lining for tank cars which is only 1/50th of an inch thick—scarcely more than a film—first made practicable the shipment of liquid caustic soda in high concentrations without metallic contamination. As numerous processes necessitate the use of caustic in its purest form, this Columbia-Southern development has enabled many companies to effect economies in their use of this essential raw material.

In spite of its thinness, this patented lining effectively seals the caustic from the steel of the tank car, and its purity—even at highest concentrations—is safeguarded throughout transit.

This is one of a number of notable contributions to industry which have made Columbia-Southern one of the nation's great producers of alkalies and related chemicals.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

EXECUTIVE OFFICES: FIFTH AVENUE AT BELLEFIELD, PITTSBURGH 13, PENNSYLVANIA. DISTRICT OFFICES: BOSTON • CHARLOTTE • CHICAGO
CINCINNATI • CLEVELAND • DALLAS • HOUSTON • MINNEAPOLIS • NEW ORLEANS • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS

Vol. 17, No. 8

CAUSTIC SODA

—a voracious chemical

The usefulness of caustic soda to industry is based upon this very power to attack and break down the chemical structure of many materials. In the manufacture of rayon, for example, caustic soda digests and purifies the cellulose . . . in the making of soap, it decomposes fats. This chemical activity of caustic soda makes it a vital raw material in a wide variety of industrial applications, and especially in the manufacture of other chemicals.



SODA ASH • CAUSTIC SODA • LIQUID CHLORINE • SODIUM BICARBONATE • CALCIUM CHLORIDE • MODIFIED SODAS
CAUSTIC POTASH • RUBBER PIGMENTS (Hi-Sil, Silene EF, Calcene TM) • CHLORINATED BENZENES • MURIATIC ACID
PERCHLORETHYLENE

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